

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Heiser's Smoke-Consuming Boiler Setting.

The importance of the problem of smoke consumption is becoming more apparent day by day, and the persistent efforts which have been made within late years to overcome the smoke nuisance are undoubtedly worthy of more successful results than have thus far been attained. Notwithstanding the various exhibitions, the ordinances passed by the authorities of manufacturing cities and the numerous so-called smoke-consuming appliances which have been introduced, the point specially aimed at has not yet been reached. The result thus far attained, however, has been valuable in one direction at least, namely, greater economy of fuel.

In the accompanying engravings, taken from the *Revue Industrielle*, we present one of the many appliances of the kind mentioned which have been introduced up to the present time, the one here considered being that of Mr. W. Heiser. The arrangement is extremely simple, and is based upon the fundamental principle, that for the perfect combustion of the hydrocarbon gases produced in the fire-box, we must introduce a certain quantity of air at a high temperature. This requirement is not always satisfied, even in well-arranged furnaces, and when a fresh charge of coal is introduced a reduction of

receive a proper amount of attention—that is, the fuel must be regularly supplied, and should have a uniform thickness over the whole area of the grate, and this, it will be readily acknowledged, is a point of vital importance, not only in this but in all cases. From a series of tests which were made with this boiler, Mr. Heiser claims to have obtained figures representing a saving of fuel of 31 per cent. Naturally, however, this figure is subject to fluctuations depending upon various circumstances, and with a Cornish boiler, arranged as here described, and burning fuel of an inferior quality, the economy realized amounted to only 12.8 per cent. In the boiler shown in our engravings the diameter of the shell is about 7 feet, the diameter of the flues 35.5 inches, the length of the refractory cylinders 6.5 feet, and the diameter of those cylinders 27.5 inches. At first sight the reader will undoubtedly be struck with the resemblance of the method to that of the Mallett system of controlled combustion, an account of which was recently published in one of the New York dailies. It will, however, be observed that the production of the draft by means of a fan and small engine is dispensed with in this case, and the "septum" wall in the latter system is replaced by the two cylinders of fire-brick or other refractory material as above stated. There is, moreover, no feed-water heating

on the part of manufacturers and steam users to comply with the smoke ordinance, arising mainly from a better understanding of the same, as well as the successful work of a number of devices for abating smoke that have demonstrated the fact that smoke from furnaces can be abated without impairing the efficiency of the furnace, increasing the consumption of fuel, or involving extra labor for the stoker.

These facts having become generally known, have had their effect upon persons owning or using boiler furnaces, and I find scarcely any opposition to the ordinance among that part of our citizens. The number of furnaces that have been equipped have produced a notable change in portions of the city. I am informed that in one neighborhood the citizens can dry clothes after washing in their yards, which has not been done for many years before.

Many have criticised my performance of official duties, being of the opinion that I should have oftener invoked penalties provided in the ordinance, to compel a more rapid and general compliance with its provisions. I desire to say here that after reflection and consultation with many who desired the success of the ordinance, it was deemed best to give boiler owners plenty of time to decide how they would comply with the law. The change contemplated by the

cellar or some out-of-the-way place which is seldom visited by the owner, and the fireman considers himself "monarch of all he surveys," and his dictum as to whether less smoke can be made in the furnace under his charge has generally been taken as conclusive. To introduce a smoke-consumer is looked upon as interfering with him and a reflection upon his ability to fire.

In numerous cases firemen have been known to do all in their power to interfere with its successful operation. I intend in the future whenever I hear of such cases to arrest the fireman, as he, under the ordinance, is clearly responsible.

There are, however, honorable exceptions to the above, and I am glad to state that there are a number of firemen who, with other citizens, take pride in doing all in their power to abate the smoke as much as possible.

Another difficulty that has been partially overcome has been that, owing to the high prices charged for devices of approved merit, a numerous class of inventors or experimenters sprang up among the engineers and firemen, who claimed to be able to construct devices that would comply with the smoke ordinance, and at very little expense to the boiler owners, resulting in a number of boilers being at this time equipped with so-called smoke-consumers that are doing but little good, the effect of which has been to

and the improvement already manifest to the observing citizen is warrant for the complete success of the ordinance. While there are many furnaces equipped with devices that do not do the work contemplated by the ordinance, I am confident that the good sense and thrift of proprietors will lead them to change to such as are effective. The great number of experiments that have been made in this city has furnished much information upon the question of smoke prevention, that in the near future will prove very valuable to our citizens, and go far to assist officials in securing a cheerful compliance with the law, thus rendering our city free from the soot and smoke which has heretofore made living below the hills an unending contest between dirt and cleanliness. The outlook is encouraging, and citizens may confidently look forward to the time when our city may compare favorably with other cities for cleanliness and air which can be inhaled without coating all the passages that lead to the lungs with soot.

In conclusion, I take great pleasure in being able to report that the ordinance is a success and will in time accomplish all its framers hoped for, and though it may take some time to completely remove the nuisance it attacks, citizens must not forget that the territory covered by the great city is large, and that the boiler furnaces are numbered

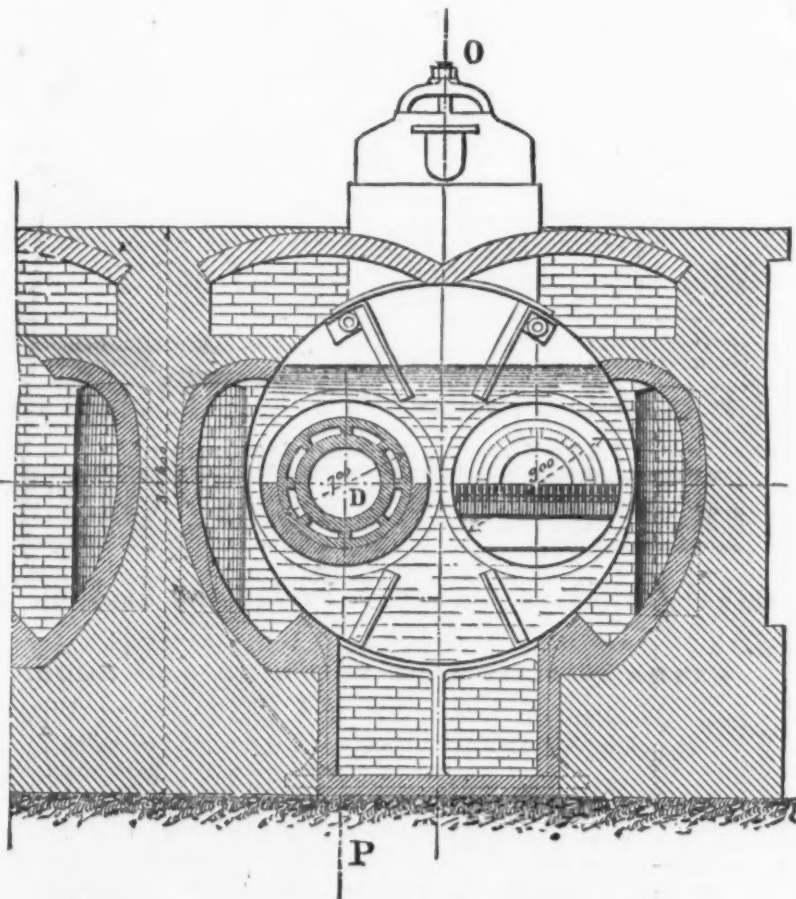


Fig. 1.—Transverse Section.

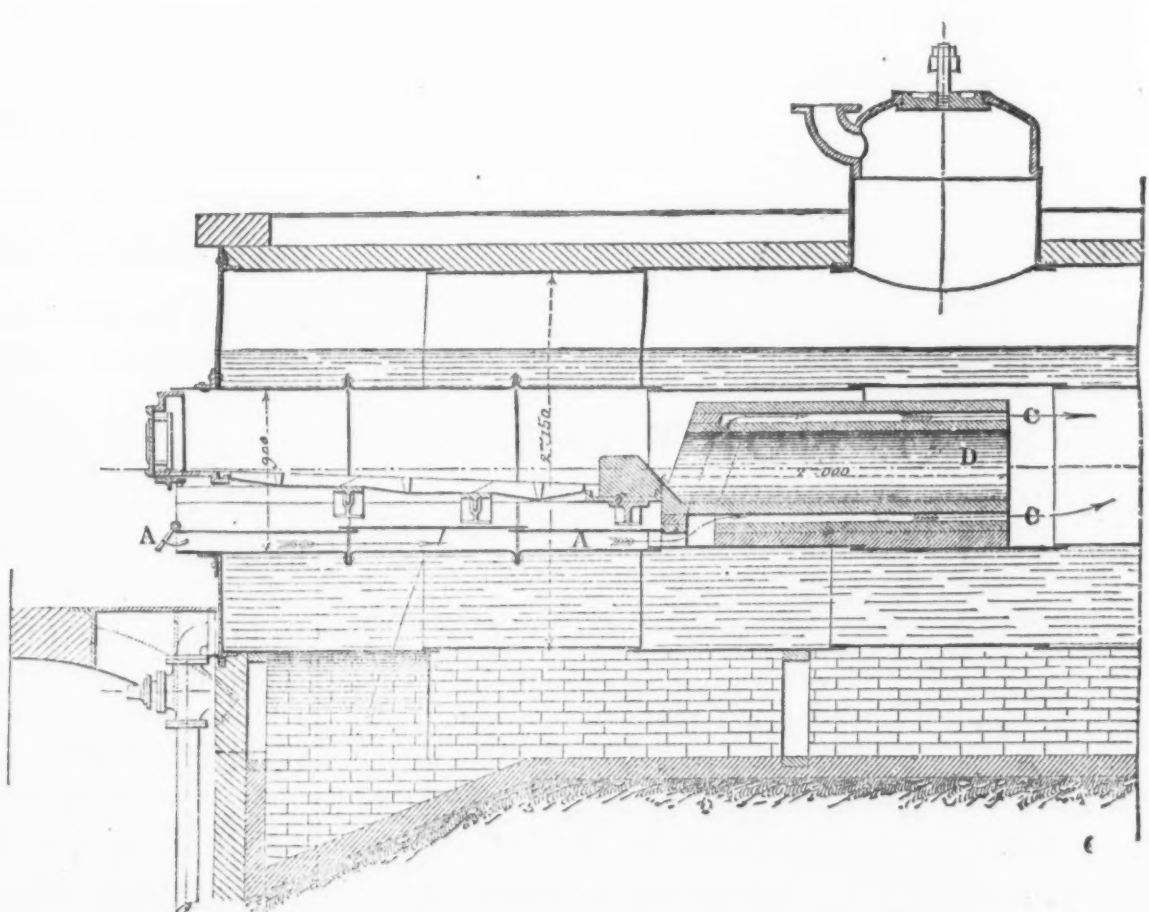


Fig. 2.—Section Along the Line O P of Fig. 1.

HEISER'S SMOKE CONSUMING BOILER SETTING.

temperature generally, if not always, occurs, and smoke is produced, the latter of course indicating an imperfect combustion of the fuel. Mr. Heiser proposes to avoid these objectionable results by arranging his boiler as shown in Figs. 1 and 2, the former being a transverse section, and the latter a section along the line O P of Fig. 1. The boiler shown is an ordinary two-flue or Lancashire boiler, the combustion chamber, however, being occupied by two cylinders, one placed within the other, and composed of some refractory material. The walls of these cylinders vary in thickness from about 2 to 5 inches, and are separated by an annular air-space which is divided into sections, as shown in Fig. 1. This space is in communication with a separate compartment, A, (Fig. 2.) underneath the ash-pit, and which may be opened or closed in front by means of a small door as shown. The air for the combustion of the coal and coke is allowed to enter through the ash-pit door underneath the grate bars, and the gases formed pass through and around the upper portion of the above-mentioned refractory cylinders, D, heating them to a high temperature, and finally enter the combustion chamber. The gases at this point still contain an appreciable quantity of combustible material, and require for their efficient utilization a proper proportion of air, or in other words, oxygen. This air is allowed to enter through the space A previously mentioned, and, as shown by the arrow, passes through the annular space between the refractory cylinders, and finally issues at C C at a high temperature. An intimate mixture with the combustible gases immediately occurs, and, favored by the high temperature, combustion ensues, the carbonic oxide taking up another atom of oxygen and becoming carbonic acid.

In order that good results may be obtained with this setting, the fire, of course, must

apparatus or condenser, and the whole arrangement is, therefore, somewhat more simple.

Smoke Consumption.

Cincinnati is thoroughly in earnest in regard to the matter of abating smoke within the city limits. As our readers know, it has taken most vigorous means to secure the desired end. Stringent regulations were passed, and our old friend, Mr. Clement Olhaber, appointed to the office of "Inspector of Smoke," which, in name at least, is about as strange an office as could be imagined. We give below Mr. Olhaber's report, which is certainly a most encouraging one, and the success which has been obtained shows that the citizens are thoroughly united in regard to the abatement of the smoke nuisance. There is little difficulty in securing any reform that may be desired when public opinion backs statutes. In this case it is evident that the public throws little or no obstacle in the way of the inspector's work, and it is a very encouraging fact that already a decided gain in the purity of the atmosphere has been attained. If public opinion was as thoroughly in favor of a pure atmosphere in Pittsburgh as it is in Cincinnati, we have no doubt that even in that smokiest of smoky cities a comparative, if not an absolute, purity would be obtained. We can best give an idea of the work which Mr. Olhaber has done by quoting his letter in full, which is as follows:

Hon. Wm. Means, Mayor.—DEAR SIR: I have the honor to submit for your consideration my report as Inspector of Smoke, together with a statement of such facts as may be of interest to yourself, and have relation to the business of my office. It affords me pleasure to be able to report an increased de-

crease in the number of smoke-consuming appliances, and a corresponding decrease in the amount of smoke. In addition, investigation showed that conditions existed in connection with many boiler furnaces that involved serious difficulties in making the changes requisite to insure a compliance with the law. To enumerate all these would take more time and space than this report will permit, but in order to show what has been done, it will be necessary to state some of them. The first great difficulty that was encountered was the overloading of boilers—that is, compelling a boiler to furnish more power than was intended when constructed. There are many such in this city (in fact the majority of boilers), and when so overcrowded, in order to meet the requirements of the factory the stoker is compelled to force the firing, keeping the furnace doors open much of the time, continuously supplying fresh fuel, and as a result requiring the frequent use of the poker, and an enormous amount of smoke is the result. When it is remembered that any successful device for preventing smoke requires a certain quantity of oxygen to mix with the olefiant gases and a heat of 830° to ignite them, it will be seen at once that a furnace that requires such constant firing will not show the same result when a smoke-preventing device has been applied as one that is of ample capacity to do the work required.

Notwithstanding the above difficulties, several devices are now in successful operation which very largely reduce the output of black smoke and soot from such furnaces. These devices, however, require more care on the part of the stoker, and in this connection it may not be amiss to state that a large amount of the smoke with which the city is begrimed is directly traceable to the ignorance or prejudice of the fireman. In most cases the boiler furnaces are situated in the

bring the smoke ordinance into disrepute, many persons claiming that they could burn smoke as effectually without smoke-consumers as above did with them, and hence no smoke-consumers were required, &c. I have caused a number of these devices to be removed and good ones substituted.

Another difficulty, I might say the greatest one, is the lack of skill and experience of a large number of persons who have been placed in charge of boilers; in fact, the carelessness displayed in this matter is almost criminal. I find in some cases where a large number of operatives are employed, the boilers in charge of persons who are utterly unfit to attend to same, and lives and property endangered to an extent that is appalling. I would suggest to your Honor that some steps be taken by the city authorities to establish a system of licensing stokers, and none be allowed to have charge of boilers unless properly qualified.

In a previous report I called your Honor's attention to the necessity of taking steps to compel railroads to abate the smoke made by yard and switch engines. A visit to any of the depots or vicinity will satisfy every one of the force of my suggestion. I learn that one of the roads entering the city has equipped some of its locomotives, and that they do the work satisfactorily. I have called the attention of the managers of the principal roads entering the city to this matter, and all promise to move in the matter as soon as they can be shown something that is practicable. I think a little legislation would help matters considerably.

To briefly sum up the result of my labors since assuming the duties of my office: On January 1 there were seven smoke-consumers in operation in the city; now more than 300 establishments have equipped their furnaces with different devices for preventing smoke. Many of these are doing good work,

by thousands, and for a single officer to secure a compliance of the law among so many must require much time and labor. I ask our citizens to wait patiently until the whole city has been covered by personal notification, after which the inspector will see to it that those who wilfully fail to meet the requirements of the ordinance by preventing the daily output of smoke and soot, will be prosecuted, and the penalties enforced. All of which is respectfully submitted,

CLEMENT OLHABER,
Inspector of Smoke.

CINCINNATI, October 7, 1882.

The Prefect of the Seine has drawn up a scheme by which associations of workmen will be admitted to compete for public works in Paris. The workmen's delegates have maintained that, if the Administration would consent to make regular payments on account, they would undertake to leave as a guarantee until completion a deposit of from 20 to 30 per cent. The Administration has agreed to this arrangement, but exacts other guarantees and conditions on the part of the men: First, the creation of a special fund in aid of those of the associated workmen who may fall ill or be wounded in the execution of the work, and for the widows and children of the deceased partners; secondly, the establishment of an arbitration board of three members charged to regulate all disputes between the men, without prejudice to the authority conferred by the regulations upon the official architects and engineers; thirdly, the nomination of one or more syndics, furnished with full legal powers to act on behalf of the association and with certificates of capacity and good conduct; these syndics will draw up the tenders, and, in case of their being accepted, will superintend their execution as clerks of the works.

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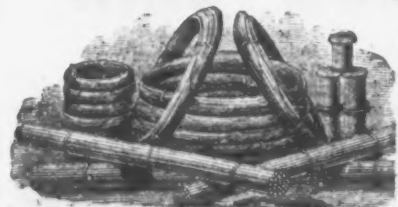
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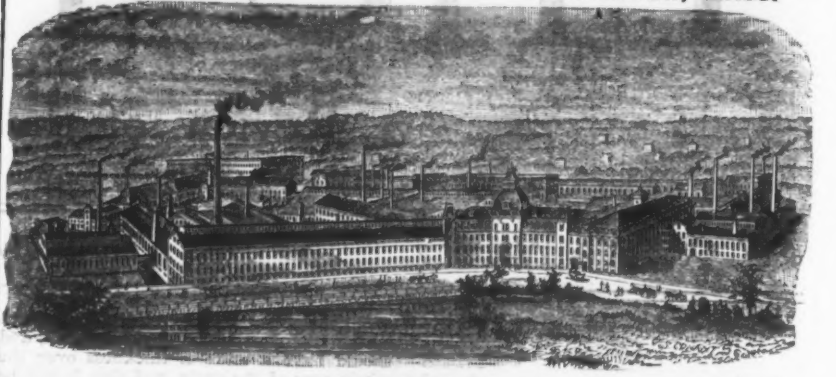
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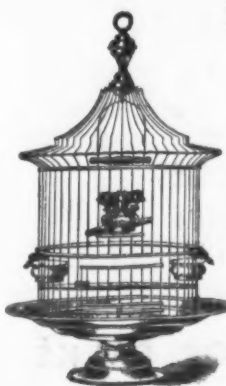
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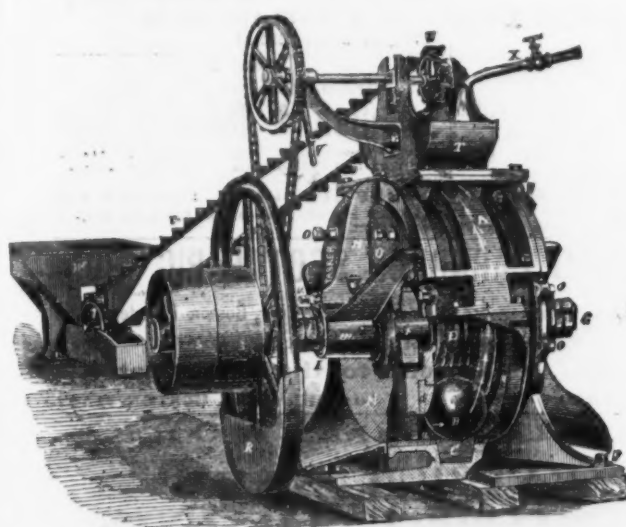
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Turbines vs. Overshot Wheels.

The question of the comparative value of turbines and overshot wheels is an ever recurring one, and a few remarks bearing upon the defects and advantages of both will, therefore, not be uninteresting. A few turbines have demonstrated that they will do as much work with the same water under the same head as an overshot wheel under similar conditions, but, as a rule, they do this only when first put in or when they have been recently put in good order. It has been shown that many turbines which have given a good percentage of power of the water consumed, are placed in such defective cases that after a time they are comparatively worthless for practical use, giving rise to the suspicion that turbines generally are so frail and troublesome that they are of much less value than the heretofore universally used wooden wheels. One of the most defective cases is the adjustable case, in which all or part of the guides are gates oscillating on a pin or bolt with the view of controlling the quantity of water admitted. These gates wear very rapidly around the pin and in a short time leak very badly, the trouble experienced from this cause having in many cases entailed considerable expense and delay, due to the frequent repairs found necessary. Another gate which often gives rise to difficulties is what is known as the register gate. When the gate is formed in a hoop, it has spaces through it at intervals to admit the water into the wheel, and the bars between

knowledge of how to construct such wheels. The overshot wheel necessitates a considerable loss of effective power, due to the head, which is nearly the same for wheels of all diameters, so that the percentage of loss from this cause will be greater as the fall is less. Added to this must be an allowance for the falling of the head by variations in the streams from natural causes. There is also a loss of head in the wheel itself, owing to the depth of the shrouding or buckets. There is an additional loss of head in consequence of the wheel emptying the water before it reaches the lowest point, and the necessity of placing the wheel some distance above the tail race so that it may not be impeded by back-water in its passage under the wheel, the water being in most cases compelled to get from under the wheel in a direction contrary to the motion of the wheel. In view of these disadvantages, it is not surprising that overshot wheels generally fail to realize more than 70 per cent. of the power of the water. The large size and slow motion of the wheel, moreover, compels the use of a large amount of cumbersome and expensive gearing, and the loss by friction is thus greatly increased. The exposed position of the wheels also renders them liable to be loaded with ice and obstructed in winter, and, being made generally of wood, they are constantly exposed to injury from exposure to the weather and are liable to soon decay. Frequent repairs are thus rendered necessary. Being constructed of wood they will, moreover, get a "heavy side" when allowed

ABSTRACT OF TESTS OF TURBINES MADE BY MR. EMERSON.

| Name of Wheel. | Diameter of Wheel in inches. | Percentage of Partial Gate Tests. | | | | | | | Percentage of Full Gate Tests. | Percentage of power developed at tests by which more than represented by its tables. | Percentage of power developed at tests by which less than represented by its tables. | Style of Gate. |
|-------------------|------------------------------|-----------------------------------|---------|--------|---------|--------|---------|-------------|--------------------------------|--|--|----------------|
| | | 5 9 | 7 10 | 8 4 | 8 10 | 7 8 | 9 10 | 9.5 10.0 | | | | |
| Risdon..... | 43 | 756 | 833 | 861 | 912 | 973 | 973 | 973 | Flanged cylinder. | | | |
| Risdon..... | 40 | 759 | 833 | 861 | 912 | 973 | 973 | 973 | Flanged cylinder. | | | |
| Risdon..... | 40 | 759 | 785 | 832 | 860 | 893 | 97 | 97 | Flang d cylinder. | | | |
| Risdon..... | 25 | 680 | 755 | 822 | 820 | 871 | 10 | 10 | Flanged cylinder. | | | |
| Boyden (T)..... | 104 3/4 | 160 | 755 | 761 | 817 | 860 | 920 | 920 | Cylinder. | | | |
| Atlantic (S)..... | 104 3/4 | 160 | 755 | 739 | 797 | 842 | 900 | 900 | Cylinder. | | | |
| Burnham..... | 30 | 546 | 540 | 711 | 711 | 810 | 810 | 810 | Register. | | | |
| Buzby..... | 36 | 578 | 578 | 711 | 711 | 767 | 767 | 767 | Fly-trap. | | | |
| Eclipse..... | 30 | 578 | 578 | 728 | 728 | 763 | 763 | 763 | Register. | | | |
| Excelsior..... | 42 | 160 | 110 | 367 | 367 | 788 | 788 | 788 | Cylinder. | | | |
| Houston..... | 30 | 486 | 609 | 650 | 650 | 812 | 812 | 812 | Register. | | | |
| Leffel..... | 40 | 568 | 664 | 675 | 675 | 788 | 788 | 788 | Fly-trap. | | | |
| Leffel..... | 3 3/8 | 648 | 664 | 675 | 675 | 743 | 743 | 743 | Fly-trap. | | | |
| Leffel..... | 3 3/8 | 648 | 664 | 675 | 675 | 643 | 643 | 643 | Fly-trap. | | | |

* Tested after one year's service.

† With diffuser.

‡ Without diffuser.

the spaces are finished to fit the surface of the guides in connection with which it is used. A portion of the time the surfaces of these bars are exposed to the water, and receive a deposit varying in thickness according to the quality of the water in which they are placed. When the gates are fitted moderately tight this deposit soon causes them to work hard, and it will be found necessary to take them apart and scrape them. If they are fitted too loosely in order to avoid this difficulty, they leak so badly as to give great dissatisfaction. In addition to this trouble this form of gate supplies the water to the wheel in such a bad form that the effect produced at "part gate" is very poor.

The register gate is sometimes used in the form of a flat plate instead of a hoop, but this can be applied only to wheels receiving the water on the top. Turbines of this form are not only affected with the previously mentioned defects of the hoop register gates, but are subjected to great downward pressure, which rapidly wears the wooden foot upon which the turbine revolves. Some turbines have the gates admitting the water to the wheel constructed with partitions, the gates being arranged so as to shut off a portion of these apartments or parts at a time. They are claimed to give good part-gate results, but the question bearing upon this point is yet an open one, and tests which have hitherto been made have failed to realize the results claimed. Closing a portion of the ports will prevent the wheel from receiving any water from that part of the case which is constituted of the closed ports, and this will cause the wheel to be fed with the water unequally at different parts. While passing such ports as may be open it will receive water at a velocity greater than usual, and while passing such ports as may be closed it will receive no water at all and, consequently, discharge the water it received from the open ports. It will thus be readily seen that the pressure will be variable and irregular in the wheel, reducing the percentage of power yielded. This is the case when the gate is moved to exactly coincide with the partitions in the case, which is the most favorable point at which it can be placed, and the position to which the makers usually direct buyers' attention. In practice, however, there is no assurance that the gate is stopped so as to exactly coincide with these partitions. As the power is controlled by a regulator the gate will be stopped at such a position that would admit sufficient water to give the required speed, and would be more likely to stop between the partitions than exactly opposite. In such a case some of the ports would be supplied with water at a greater pressure than others, and there would, consequently, be an irregular pressure in both case and wheel. When the gate is stopped so as to exactly coincide with some of the partitions in the case, and thereby exclude the water from some of the ports, the pressure is so much greater in some of the ports than in others that the partitions, or guides, have been known to spring sufficiently to bind the wheel, and the higher the head the more likely is this to occur.

Wooden wheels on horizontal shafts were heretofore more generally in use than any other kind, and there is an admission even now on the part of some turbine manufacturers that such overshot wheels are more economical proportionately than turbines at part gate, and who advise the putting in of additional wheels for varying streams; the fact that overshot wheels were in more extensive use was due to the great abundance of wood which is so extensively used in their construction, and also from a more general

to stand for any length of time, and the motion will consequently be rendered unsteady.

With a turbine wheel the full head and fall of the water is effective, except as it is affected by friction, which is comparatively inappreciable. In addition to this their higher speed and smaller size allows the adoption of simple and light gearing. The space required by them is much smaller than in the case of the ordinary overshot wheel, and, taken altogether, it will be seen that turbines possess advantages which in many cases render their adoption more desirable; their higher cost, however, is sometimes a drawback, and the more inexpensive, though less efficient and more cumbersome, wooden wheel is adopted.

In conclusion we submit the accompanying table, which is an abstract of tests of turbines very accurately made by Mr. Emerson, and which we think will be found both profitable and interesting to our readers generally.

SCIENTIFIC AND TECHNICAL.

Determination of the Proportion of Carbonic Acid in the Air of Mines.

A simple apparatus for testing the air of mines was recently sent to the Royal Cornwall Polytechnic Society by Dr. C. Le Neve Foster. In an accompanying paper, Doctor Foster remarked that the necessity of providing a proper supply of pure air to all places in which men are living or working was thoroughly recognized. It was requisite, however, to have some means of testing the purity of air, so that in the first place the air of any confined space could be compared with the external atmosphere, and decision made whether or not the impurities attained proportions injurious to health, and secondly, to ascertain by exact experiments what amount of improvement was effected by the use of any ventilating apparatus. The test relied on by miners was the manner in which a candle burned. They considered that if it burned freely when held upright, and did not go out if moved quickly from side to side, the ventilation must be good. It had been shown, however, that this was a fallacy and that the candle gave no sign of the air being bad until the impurities had reached a point far beyond the maximum consistent with good ventilation. Some other test, therefore, was necessary and Doctor Foster proposed a plan which consists in observing the precipitate produced in baryta water by the carbonic acid gas of the air under examination. First of all, the degree of milkiness is noted produced by passing a given volume of pure air through the baryta water and then it is determined experimentally how much of the air of the mine or room is required to produce a precipitate of equal opacity. The apparatus consists of the following parts: A wide-mouthed bottle holding about two ounces, into the cork of which are fitted two glass tubes, one of which simply passes through the cork, the other down to the bottom; a piece of India-rubber tube from six to eight inches long; a T-shaped tube provided with two valves; and a flexible India-rubber ball holding one or two ounces. The piece is fitted to the ball, and connected by the tube to the bottle, the valves being so arranged that squeezing the ball forces the contained air into the bottle, and removing the pressure fills the ball from the air in which the apparatus is placed. After giving the ball a few squeezes, so as to fill the bottle with the air to be tested, half an ounce of baryta water is poured in and the cork is re-

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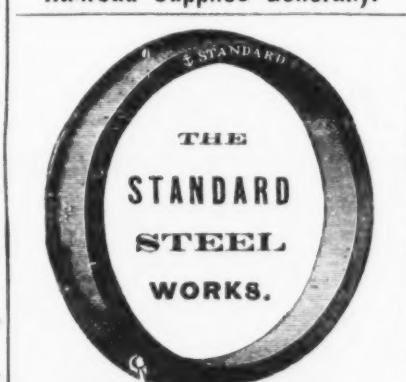
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placed. The bottle is then well shaken, more
air squeezed in, and the operation repeated
until the water becomes slightly milky. The
number of fillings is noted, and the air in the
bottle reckoned as one to two, according to
the size of the ball. The standard proposed
by Doctor Foster is that amount of opacity
which prevents a pencil-mark on paper be-
ing seen through the solution. If 40 strokes
of a 1-ounce ball in open air containing .04
per cent. of carbonic anhydride produces
this effect, the air of a mine would contain
.16 per cent if only 10 strokes were necessary,
.32 per cent. if only 5. The box arranged
is not larger than an opera-glass, but con-
tains the apparatus and the means for six
tests in half-ounce phials of baryta water.
The bottle should be washed out with dis-
tilled water.

A New Explosive.
Panchastite is the name given to a new
explosive discovered by M. A. Turpin, and
with which some experiments have lately
been carried out at Charbourg. It is com-
posed of two liquids, perfectly harmless when
separate, but which constitute, when mixed,
a highly explosive compound which resists
the shock of a weight of about 15 pounds,
falling from a height of nearly 2 feet, while
dynamite explodes under a shock of the same
weight, falling from a height of only 10
inches. Comparative trials of both explo-
sives were made by boring several holes in
some rocks at Charbourg, some of which
were charged with dynamite and the others
with the new explosive. It is stated that
the effects produced by the latter were
always superior to those obtained with the
dynamite, although double the quantity of
the latter was employed. Other experiments
made with lead cylinders gave the following
results: The cylinder crushed by dynamite
assumed the form of a mushroom, the edges
of which, turned back underneath, reached
half way down. The cylinder subjected to
the action of Turpin's explosive, much less
in quantity than the dynamite, was rent
asunder for two-thirds of its original height,
the pieces being hurled to a distance, and
the portion which remained was so much
penetrated by the gas evolved that it assumed
the shape of a torn sponge. Lastly, a car-
tridge of the new explosive, placed upon a
rail, reduced it to pieces, which deeply pen-
etrated an oak sleeper, thus breaking it into
two pieces. Other experiments on different
substances also gave excellent results in
favor of the new explosive.

The Formation of Diamonds.
Mr. A. B. Griffiths contributes to the
Chemical News a communication in which he
attempts to point out that the formation of
crystallized carbon in nature can be theoretic-
ally accounted for. He says: "We know
that the diamond has been found in a fine-
grained sandstone in Brazil, and is princi-
pally found in an alluvial matrix of sand-
stone and quartz pebbles. Knowing these
facts, and that there are only three meth-
ods by which crystals are formed, namely,
by fusion, by solution and by sublimation,
and as the diamond has been found in sedi-
mentary rocks, and in an alluvial matrix
of sandstone and pebbles; and knowing
that sandstone and pebbles are produced
by the action of water, hence their name
of aqueous rocks; and as aqueous or sedi-
mentary strata are often fossiliferous, we
may draw an inference that the carbonace-
ous matter of the fossils (plants and animal
remains) has been dissolved by highly-
heated water, aided by great pressure ex-
isting in the crust of the earth. It is a
well-known fact that highly-heated water,
aided by pressure, can dissolve silica, as in
the geysers of Iceland, &c., where it is
deposited around the mouth of the vent
forming "the sinter," and also we have
the experimental researches of De Senar-
mont, and others, on the artificial pro-
duction of crystallized minerals, as quartz,
mispickel, corundum, heavy-spar, &c., by
the prolonged action of water at high tem-
peratures and pressures; and I think we
can see no reason why highly-heated water
or water-gas should not have the power of
dissolving the carbonaceous matter of fos-
siliferous plants and animals, and then, on
cooling, depositing the carbon in the crystal-
lized condition, forming the gem known as
the diamond. As to whether the diamond
was formed by sublimation, we can draw
no inferences from facts or from nature;
so must put this method of forming crystals
on one side, as not being able to solve the
problem; and further, the diamond cannot
be formed by fusion, because we know that
crystallized carbon, in the form of graphite,
is formed by fusion. Therefore, it appears
from these views on the subject that the
diamond has been formed in nature by the
solvent action of highly-heated water or
water-gas, aided by enormous pressure on
the carbonaceous matter of fossils contained
in sedimentary rocks, followed by slow
cooling.

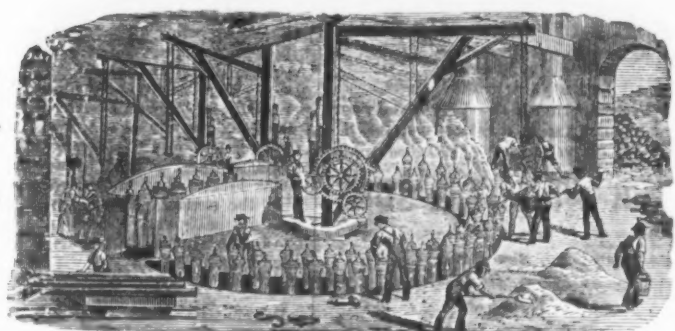
**The Determination of the Percentage
of Niter in Gunpowder.**
At a recent meeting of the Miners' Asso-
ciation, of Cornwall, Mr. Beringer described
a simple method for testing gunpowder for
its percentage of niter in little more than an
hour. Mixed with some inert material, such
as barytes, a sample of powder may be heated
sufficiently to drive off the sulphur with-
out fear of ignition, and if the desulphurized
powder be further heated, the charcoal will
be quickly burnt up, without causing loss,
defflagration or explosion. With the sulphur
and all but the ash of the charcoal removed,
nothing of the powder remains except some
potash salts derived from the niter. By the
addition of sulphuric acid and subsequent
ignition, these salts are converted into potas-
sic sulphate and from the weight of this the
percentage of niter can easily be calculated.

Adhesive Power of Nails and Screws.
The extensive use to which nails and
screws are put in construction lends con-
siderable interest to any records of experience
tending to discover their holding power.
Haupt in his "Military Bridges" gives a
table of the holding power of wrought-iron
rod, nails, 77 to the pound, and about 3
inches long. The nails were driven through
a 1-inch board into a block and the board
was then dragged in a direction perpendicular
to the length of the nails. Taking a pine
plank nailed to a pine block with eight nails

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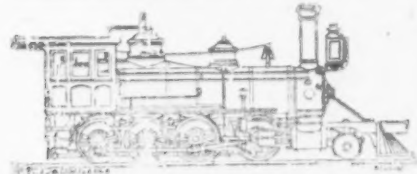
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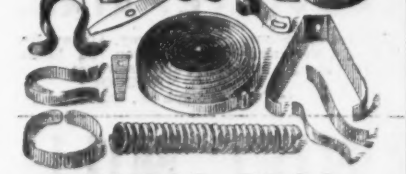
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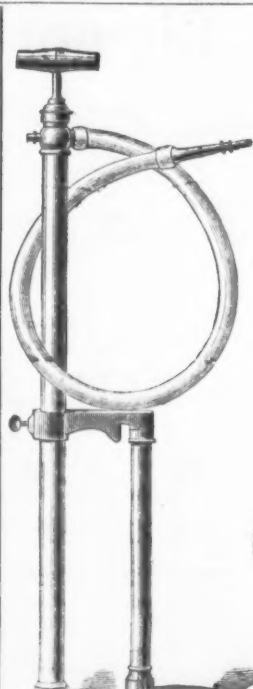
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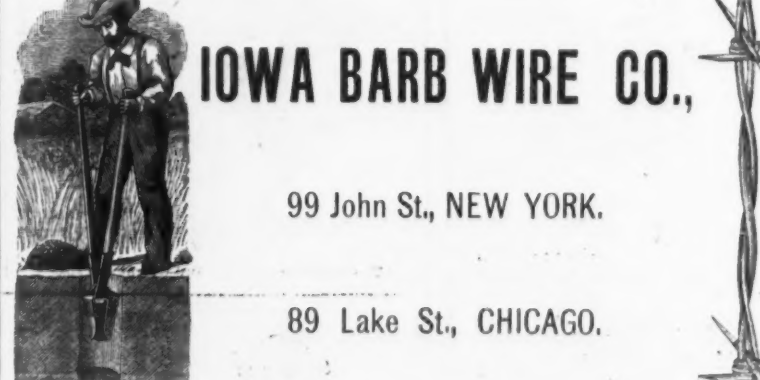
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to the square foot, the average breaking weight per nail was found to be 350 pounds. Similar experiments with oak showed the breaking weight to be 415 pounds. With 12 nails to the foot square the holding power was 542½ pounds, and with six nails in pine 463½ pounds. The highest result obtained was for 12 nails to the square foot in pine, the breaking weight being, in this case, 612 pounds per nail. The average strength decreases with the increase of surface. Tredgold gives the force in pounds required to extract 3d. brads from dry Christiansa deal at right angles to the grain of the wood as 58 pounds. The force required to draw a wrought-iron 6d. nail was 187 pounds, the length forced into the wood being 1 inch. The relative adhesion when driven transversely and longitudinally is, in deal, about 2 to 1. To extract a common 6d. nail from a depth of 1 inch in dry beech, across grain, required 167 pounds; in dry Christiansa deal, across grain, 187 pounds, and with grain 87 pounds. In elm the force required was 327 pounds across grain, and 257 with grain. In oak the figure given was 507 pounds across grain. From further experiments it would appear that the holding power of spike-nails in fir is from 460 to 730 pounds per inch in length, while the adhesive power of screws 2 inches long, .22 inch in diameter at the exterior of the threads, 12 to the inch, driven into ½-inch board, was 790 pounds in hard wood and about one-half that amount in soft wood.

Effect of Sunlight upon Glass Surfaces.

The action of sunlight on colorless and colored glass—both polished and rough—is so marked as to have received the special attention of chemists. Very perceptible changes have been observed, that is, from colorless to yellow, and from light yellow, green or blue to the darker or mellow shades of these colors, and specimens of coffee-colored glass are instances which, in the space of only five years, had materially changed to rose and amber colors. It is thought that the rich, mellow tones so much admired in the old and richly stained cathedral windows are due to the action of the sunlight in a long succession of years in tinging down what were most probably comparatively bright or harsh colors originally; the action, it is supposed, may be a photo-chemical one.

Crystallization of Silica from Fused Metals.

Dr. R. S. Marsden, on an examination of microscopic sections of some Berlin porcelain crucibles which had been used in experiments with fused silver and amorphous carbon at a temperature considerably above the melting point of the former, found that, while the alumina part of the crucible had undergone little change, the glaze had become a "mass of little crystals of a hexagonal form." Similar prisms were separated from the silver. The crystals quietly dissolved in hydrofluoric acid, while not acted on by nitric or hydrochloric acid. There were also leaf-like forms, apparently silica, which are not yet fully explained.

The Color of Pure Water.

Considerable difference of opinion as to the color of perfectly pure water has hitherto prevailed, and the investigations of Mr. Victor Meyer, a German experimenter, may therefore not be uninteresting. In the course of his experiments he found that the color of perfectly pure water is neither blue nor green, but a shade between the two. In order to demonstrate this, he took five glass tubes, about .16 inch in diameter and about 5 feet in length, which he connected by means of rubber tubing, thus forming a tube about 25 feet long. Both ends of this tube were closed with glass plates fitted in metal sockets, the latter being furnished with brass nozzles for filling the tube with water. The tube itself was placed in an exactly horizontal position and covered with black cloth. Upon looking through the tube, the field of vision appeared perfectly colorless, the color of the glass from exerting any influence. Upon filling the tube with distilled water, however, an intense bluish-green was observed, which he considered to be the color of perfectly pure water.

Raindrops, Hailstones and Snowflakes.

In an article on "Raindrops, Hailstones and Snowflakes," Prof. Osborne Reynolds says: A cause may be assigned for the difference between the solid ice granules which constitute the hailstone and the open, lace-like snow crystal. When a cloud of water particles already formed is cooled to a temperature below 32°, the fog becomes frozen and the particles retain their spherical shape, and the downfall from such a cloud is hail. But when clear air, at a temperature below 32°, is further cooled, the steam condenses at once into ice, and, as is well known, it is by this mode of condensation that crystals are formed. Both these actions may be seen on a window during a sharp frost. As the window cools its lower portion becomes covered with dew, deposited first in the form of water; as the cooling proceeds, this dew becomes frozen into an opaque coating of ice, but without showing any crystalline forms, and thus corresponds to the hail granules. But the dew deposited, particularly on the upper portion of the window, after freezing has commenced, takes the beautiful crystalline shapes so well known, and which correspond in all particulars to the crystals in the snowflake. This cause for the difference to the conditions under which snow and hail are observed to occur. Snow occurs during frosty weather when the general temperature of the air is below 32°. But hail hardly ever falls when the temperature of the lower air is low, and generally when it is high. It is the suddenly formed dense cloud of higher temperature which sends down hail. When a body of heavily saturated air at a temperature of 60° or 70° ascends, as it rises it forms into a cloud, three-fourths of its steam being condensed before its temperature falls to 32°. If then no further elevation of the cloud takes place, the downfall will be rain; but if the temperature is further lowered, the water particles are frozen into ice particles of the same shape, and these frozen spheres aggregate to constitute hailstones.

Filtration Through Spongy Iron.

Several years ago, Messrs. Easton and Anderson carried out a series of experiments to determine the effect of filtration through spongy iron on the water obtained from the river Nethe, for the supply of Antwerp. The experience gained during these experiments was so satisfactory that the gentlemen mentioned put up permanent filters for treating the water by spongy filtration on Professor Bischof's system, and some reports giving the results of the first year's working of the system are now at hand. Professor Bischof's system is now being developed by the Spongy Iron, Water and Sewage Purifying Company, Limited, of Great Britain, an association including Dr. C. W. Siemens, and several other well-known scientists. Dr. Frankland, who visited the Antwerp Water Works at Waelheim, several months since, when the water at the intake, 15 miles above Antwerp, was in a very bad condition, submitted an interesting report to this company. According to this report the water obtained from the river Nethe is first allowed to settle from 12 to 24 hours, in suitable reservoirs, and is then pumped on to spongy-iron filters, from which it flows by gravity over sand filters. The former consist of concrete bed upon which are laid first two loose layers of brick, and then a layer 3 feet thick of a mixture composed of one part of spongy iron, and three parts of gravel 1-5th of an inch in diameter. Upon this mixture is placed a layer of gravel 3 inches thick, and above this again a bed of sand 2 feet thick, thus making a total thickness of filtering material of 5 feet 3 inches. The sand filters also consist of a concrete bed with two layers of bricks, while upon the bricks is laid a bed of gravel 1-5th of an inch in diameter and 12 inches thick, then 3 inches of fine gravel, and finally 2½ feet of sand, the filtering material being thus 3 feet 9 inches thick. Each filter has an area of 7302 square feet, and the filtration goes on at the rate of from 300 to 500 gallons per minute or from 60 to 100 gallons per square foot per 24 hours. Dr. Frankland reports that the effect of the filtration through the spongy iron was exceedingly satisfactory. The unfiltered water, after settlement, contained in each 100,000 pounds 21 pounds of solids, mostly in solution, the impurities including 0.623 of carbon, 0.219 pounds nitrogen, 0.028 pounds ammonia and 1.3 pounds of chlorine in the form of chlorides, while the total quantity of nitrogen in all forms reached 0.243 pounds. Dr. Frankland states that one filtration through spongy iron, followed by one through sand, showed total percentage reduction below:

| | Per cent. |
|-------------------------|-----------|
| Total solids | 41.3 |
| Organic carbon | 60.9 |
| Ammonia | 74.9 |
| Total combined nitrogen | 77.3 |
| Chlorine | 92.0 |
| Temporary hardness | 13.0 |
| Permanent hardness | 35.3 |
| Total hardness | 27.0 |

Boiling the doubly-filtered water reduced the hardness to 4.4 parts per 100,000, or 3.1 on Clarke's scale. Dr. Frankland, however, attaches special importance to the fact that spongy iron filtration "is absolutely fatal to bacteria and their germs." In the face of the recent discoveries as to the modes of propagation of disease, this property of spongy iron evidently becomes one of paramount value, and it opens up a wide field for the treatment of water on Professor Bischof's system. From the above report it would appear that Professor Bischof's system of filtration on a large scale is one worthy of considerable attention, and its practical development will undoubtedly be watched with much interest.

Iron Ores of Sweden.

Prof. Richard Ackerman, of Stockholm, has submitted a report on the iron ores of Sweden, the following translation of which was recently published in *Iron*: The iron ores of Sweden consist principally of black ore, or magnetite (magnetic oxide) and hematite or specular iron (peroxide or sesquioxide), which are usually called by the common name of mountain ores, to distinguish them from the other kinds of iron ore found in Sweden, lake and bog ores, which are, however, only met with in any considerable quantity in the province of Smaland. The magnetic ores are not always composed exactly according to the formula Fe³O₄, but they may also, with an atom of peroxide, contain either more or less of protoxide, the latter generally combined with silica. Very often the magnetic ores are irregularly interspersed with larger or smaller quantities of specular ore, and sometimes, as for instance, at Gräsberg (Kopparbergs län), the magnetic ore is mixed with so much specular ore that it is difficult to decide to which species of ore it ought to be assigned. The magnetite and specular ores belong to the primitive or Laurentian formation, and occur, with few exceptions—as, for instance, at Taberg, in Smaland, which is of volcanic origin—as beds or stratified masses, and, consequently, they have the same strike and dip as the adjacent rock. As a rule, the beds are considerably elevated, but sometimes also sharply folded, for which reason the dip, though very different in certain places, commonly approaches more to the vertical than the horizontal. Many deposits have no considerable longitudinal extension, but soon thin out; if the strike of the stratum is followed, however, sooner or later a new lenticular mass of ore will be met with; and in this way a bed of ore, thinned out at intervals, may sometimes be followed for a distance of several Swedish miles, forming what is called in Sweden a "malmslück." Other iron deposits, on the contrary, with a more or less variable breadth, have an extension of some thousand feet. The beds may in some instances, besides thinning out in the way described above, be cut off abruptly and more or less heaved up by cross courses (skolor) of chlorite schist, felsite and granite. The thickness of the beds vary from mere nothing to 100 and 120 feet. In every mining field there are also commonly found several parallel beds, separated from each other by more or less sterile rock. The principal mass of metamorphic rocks of Sweden is gneiss, but much also consists of urtite, hornblende, felsite, schist (glimmerfjanta), limestone, &c. The geological ar-

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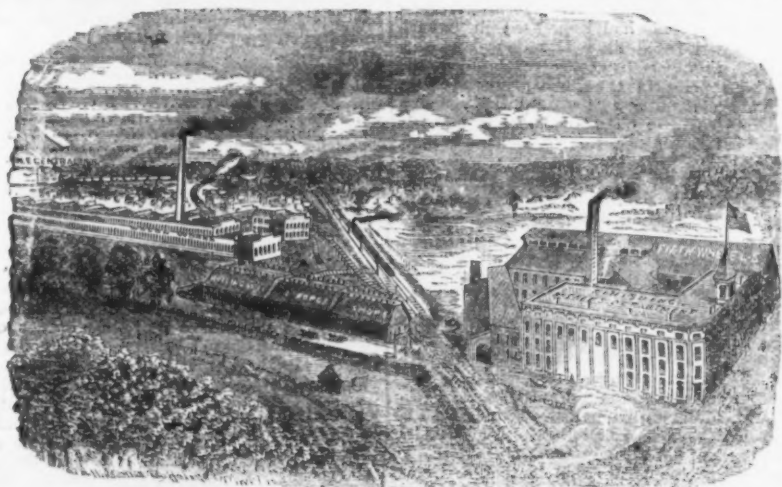


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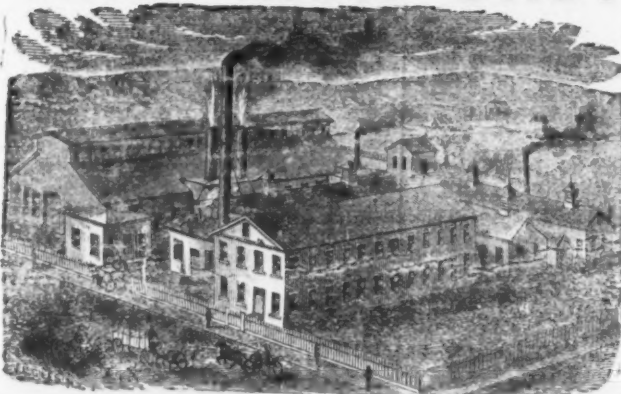


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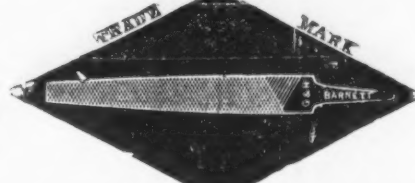
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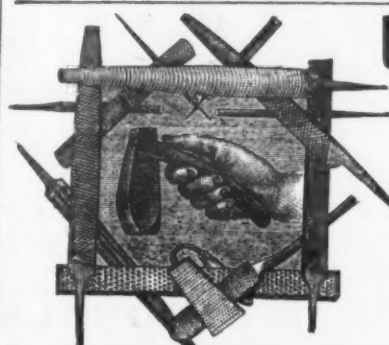
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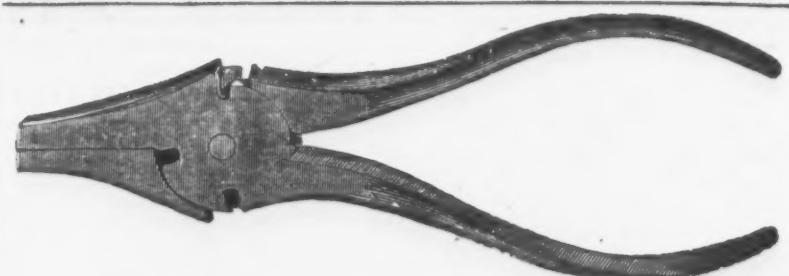
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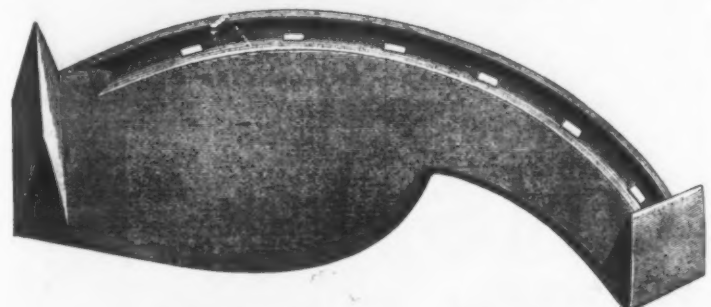
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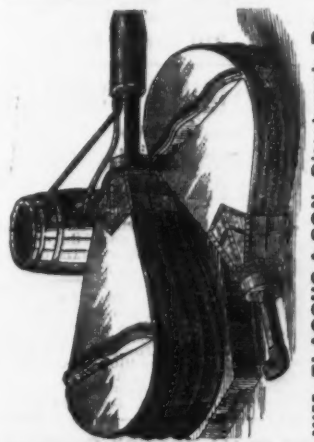
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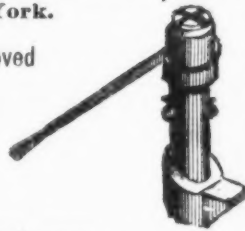
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range of the Swedish mountain ores is various, but from a metallurgical point of view they may be brought together into three divisions. The first comprises the ores lying immediately in more or less eutritic gneiss. The passage from the sterile to the metalliferous rock is in this case, as a rule, very imperceptible, so that the deposit may be said to consist of more or less eutritic gneiss, or sometimes mica schist, whose constituents other than quartz have been more or less replaced by iron ore. Both these ore beds and the rock in which they occur have in general very distinct surfaces of deposition, and the strike is commonly even and regular. The ore beds belonging to this division are further distinguished by their deficiency in augite and hornblende, as well as limestone. They contain in general some feldspar, and consequently more alumina. It is considered that the absence of feldspar causes the ore to contain more phosphorus than many other Swedish ores, which is also in some instances owing to large quantities of apatite being interspersed. The most typical of the ores belonging to this group lie in eutrite, which is generally red in color and somewhat gneissic. Most of them are specular ores, which are often marked by a very distinct striping, caused by repeated alternations of pure iron ore seams, with seams of eutrite and quartzite, in such a way that the same series of beds may contain hundreds of seams of ore intermixed with barren rock. The ores lying in the gneiss rocks proper, are sometimes very rich in silica, but not in so high a degree as those described above, and they are mostly magnetites, and have associated with them not unfrequently some malakolite, and sometimes also limestone, but neither in large quantities.

The ores of the first division are accompanied, as has just been pointed out, by quartz only, and rarely by any other mineral. Those of the second division are, however, continually associated with extensive foreign formations, such as hornblende, asbestos, talc, calcspar, &c. These ores occur almost exclusively within the gray eutrite, interstratified with beds of crystalline limestone and "hällfint"; and, as a contrast to the ores of the first division, those of the second are separated from the rock in which they occur clearly, and with an exceedingly well defined boundary, and are, besides, generally purer and more concentrated than those of the preceding class. In most instances they appear as nodules imbedded in the rock, often arranged in rows, and forming a kind of layer. Deposits of this division have, therefore, very often a great width, but less longitudinal extent than those of the first. As the ores of the first-mentioned group are characterized by their richness in quartz, those of the second are remarkable for the quantity of magnesia they contain; and although they may commonly be smelted without any, or at least with a very small flux of lime, they sometimes, particularly where the rock is rich in magnesia, cannot be smelted without an addition of both lime and quartz. Non-metalliferous quartz is, however, used very seldom as a flux; it is, as a rule, mixed with silicious ores, of which there is rarely any want in Sweden. The third division of ores comprises those which contain a considerable quantity of manganese, and also very often a not inconsiderable quantity of sulphides. These ores, lying partly in hällfint and partly in limestone, are not so sharply defined as those of the preceding group; but the passage from the metalliferous rock is, in their case, sometimes more imperceptible still than in those belonging to the first group. The contents of manganese derived from interspersed minerals as knebelite, rhodonite, &c., appears in general to increase simultaneously with the contents of iron; but in some others, deposited in limestone, the compounds of manganese appear to be equally mixed with the latter, so that the contents of manganese are sometimes quite as large in that part of the deposit which is poor in iron as in that which is richer. The greatest number of ores in this group are magnetites, but ores consisting of peroxide of iron also occur exceptionally, and should belong to this group. Some of the manganeseiferous ores, as those of the Klackberg field in Vestmanland län, are very rich in lime, so that they require, when being smelted, to be mixed with silicious ores; others, as those of Dannemora, are, however, what in Swedish is termed "engande" (going by themselves), and as their gangue consists of such minerals or mixtures, no flux is required for the smelting of these. There are also ores rich in manganese, as those of Wiker, in Örebro län, which, in consequence of the large amount of magnesia they contain, require, when being smelted, to be mixed with both lime and quartz.

The greater number of Swedish ores must, in order to yield a glassy slag, be fluxed with lime, and most of them are thus more or less acid, or, as it is called, "dry." By the word "dry," stones are, however, only denoted, the more silicious ores belonging to the first group, and as proper types of these may be mentioned the specular ores of Norberg and Ströberg, in Vestmanland. Such ores must, in order to yield a bisilicate slag, be fluxed with some 30 per cent. and even more of limestone, while, for the same purpose, most of the dry magnetites do not require more than about 20 per cent. of the same flux. Many magnetic ores belonging to the second and third classes require, as has already been stated, no flux, and along with these are generally found series of moderately acid ores. Some of the ores belonging to the third group are quite basic, but the supply of these ores is comparatively small, and they are, in consequence, only used for mixing with others, and are therefore called "mixing-stones." These ores, which in general are magnaniferous, but, unfortunately, often mixed with sulphides, have always been valued higher for the preparation of steel than the bulk of other ores, especially when their contents of sulphides is not great; but their value has increased still further since the introduction of the Bessemer process in Sweden. As a typical mixing-stone specially suitable for the Bessemer manufacture, may be mentioned the ores of Öranrot, in Klackberg and Norberg, which contain from 6 to 10 per cent. of protoxide of manganese; and other ore rich in manganese, but not basic, is that from the Penning mine, which contains from 12 to 14 per cent. of protoxide of manganese. Still richer in manganese are

several others, as, for instance, Svartberg, Schisshyttan, with from 13 to 20 per cent. of protoxide of manganese, and which also contain such a quantity of sulphide as to make them better adapted for the manufacture of spiegeleisen than Bessemer pig iron.

The iron contents of Swedish ores varies from 30 to 70 per cent., but it is generally from 45 to 50. As, however, the calcareous ores are much scarcer than the silicious ones, ores occurring in limestone are sometimes used, although their contents of iron is as small as 20 per cent., and even less, but such ores are not charged into blast furnaces alone, but mixed with richer silicious ores. In several iron ores, particularly those belonging to the first division, the contents of alumina is not altogether inconsiderable; but, in comparison with a great number of foreign ores, the Swedish mountain ores contain very little alumina, while the ores belonging to the second group in particular, and some of those belonging to the third, are, as a rule, very rich in magnesia. They contain generally very little phosphorus; and among those that are freest from the mineral may be mentioned the Dannemora ore, containing 0.003 per cent., and the Persberg, 0.005 per cent. The contents are, however, generally between 0.005 and 0.05 per cent., but some Swedish ores contain much more phosphorus, even as much as some tenths per cent., and this is particularly the case with some of the rich iron ores in Lappmarken, as those of Kiruna and Gällivara.

Mountain ores containing more than 0.1 per cent. of phosphorus are, as a rule, employed in Sweden only for mixing with others containing less phosphorus. The phosphorus in the ores which are richest in this mineral is derived from apatite interspersed in the ore, and some of the Grängesberg ores are so rich in this mineral that it has been considered advisable to treat them in the wet way in order to remove the apatite and utilize it as a superphosphate. The ores which are freest from phosphorus are generally used for producing iron for steel-making, and as Swedish iron consumed in this country is chiefly destined to serve as a material for the manufacture of steel, the value of the Swedish kinds of iron formerly depended on their freedom from phosphorus. As Swedish iron, however, from the time of the introduction of the Lancashire process, has become more and more even and compact, it has also succeeded in gaining an extended use, even for finer manufactures, and the kinds of iron which have been produced with the greatest care have, indeed, at times fetched nearly as high a price as the better kinds of Swedish iron for steel production. The value of iron intended as raw material for manufacturing purposes is not so dependent on the absence of phosphorus as is that of steel iron, but if the contents are only some hundredths per cent., or, at least, do not exceed 1 per cent. (for some of the purposes for which Swedish iron is employed abroad the iron may even contain a little more phosphorus), it is the closeness and evenness of the iron itself which is most valued when the iron is intended for manufacturing purposes. Ores, therefore, containing some hundredths per cent. of phosphorus are employed in preference in the making of such iron. While ores containing the smallest quantities of phosphorus are preferably employed for the production of steel iron, it is also for this purpose that those which contain much manganese are considered most suitable. The main point in the production of steel iron is just the choice of ores which are perfectly suitable for this purpose, while less attention needs to be directed to the refining process itself, inasmuch as closeness and especially evenness are less necessary qualities for steel iron. The contrary is the case with the production of iron for manufacturing purposes. For such iron the qualities just mentioned are the chief requirements, and its goodness is therefore most dependent on the attention which is directed to the refining process and the welding of the refined iron. It is not, however, the case that a nearly absolute freedom from phosphorus in ores may not also be of consequence for some purposes, and, indeed, many ores nearly free from phosphorus are used in Sweden for making iron intended for manufacturing purposes. The greater number of silicious specular ores are very free from sulphides, and many also of the magnetic iron ores contain only an exceedingly small proportion of sulphur; most of the magnetic ores are, however, so interspersed with metallic sulphides—as sulphides of iron and copper, magnetic pyrites, zincblende, galena and arsenical pyrites—that the ores, if the iron produced is to be free from sulphur, must be subjected to a careful calcining. In 1840 the Swedish engineer Starbäck used furnace gas for this purpose, and the shaft calcining kilns then invented speedily displaced the older kilns, in which the ore was roasted with wood and charcoal refuse, so that the latter were already in 1850 in little use. The best gas calcining kilns in use in Sweden are those constructed by Westman, of which the first was erected in 1851, on which construction he has, however, improved during later years. In this calcining kiln the temperature may be so high that the most refractory ores are reduced, and by the help of these furnaces many ores which could not formerly be used on account of the sulphur they contain, can now be utilized. These furnaces have, notwithstanding the larger quantity of gas which they consume, more and more replaced the older gas calcining kilns, in which the same temperature cannot be kept without the ore running together in such a way that it cannot be got out without the greatest difficulty. Some of the ores found in Sweden are very rich in titanium, which does not appear to be in general a desirable ingredient, as the reduction of such ore is rendered difficult by the presence of that mineral, and the consumption of charcoal in smelting ores rich in titanium is consequently very great. Among such ores, that at Taberg, in Jönköpings län, deserves special notice, as it is in several respects different from the ores common elsewhere in Sweden. It consists of a mixture of olivine, partly decomposed to serpentine, and grains of titanate of iron covered on the surface with silicate of protoxide of iron and feldspar. This mixture is so intimate that the three ingredients can only with difficulty be distinguished.

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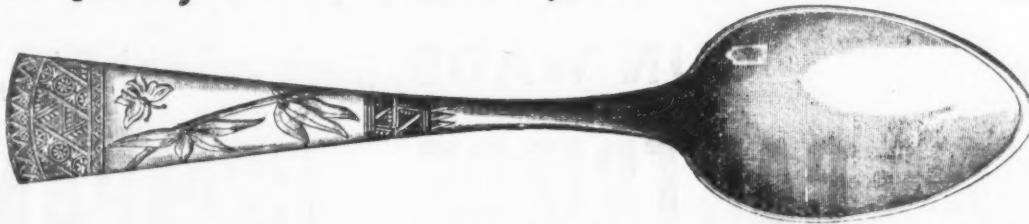
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guished by the naked eye, and it has, in consequence, also been found impossible to increase the contents of iron in this ore by a dressing process. At Taberg a whole hill has been formed of such ore about 400 feet in height and 9000 feet in length, but the contents of iron are not greater than 30 per cent., and, further, it contains the large quantity of 6 per cent. of titanic acid. There is in some Swedish ores also found a small quantity of bitumen, as, for instance, in the ores of Gök and Torf, in Norberg, and Wiker in Nora, and in others, as that of Uddevalla, in Norberg, a little graphite.

The lake and bog ores we mentioned above as being found in Sweden, consist of hydrated peroxide of iron, and are formations belonging to a very recent period. They are, in fact, still being deposited. They occur in several provinces, and have, in former times, been used for the direct production of malleable iron. Containing, in general, several tenths per cent. of phosphorus, they are employed only in the production of foundry and puddled iron. The lake ores, which, according to their appearance, are called gunpowder, pearl, penny, or cake ore, form beds up to 2.5 feet in thickness, and occur in reedy places, a little distance from the shores of the lakes. They are taken up with long-shafted scrapers and riddles of iron in the winter, when the lakes are covered with ice, and the beds are afterwards again formed, so that a new bed may be formed in the same place after some years. This production of ore is, however, not of great importance in Sweden.

The quantity of mountain ores raised in 1880 in Sweden was 750,000 tons, and of the lake and bog ores just described, 5000 tons.

METALLURGICAL NOTES.

The Distribution of the Different Elements in Steel Ingots.

Mr. G. J. Snelus, of Workington, England, has at different times analyzed specimens taken from the first and last ingots from one cast, and also from the top and bottom of the same ingot of steel, without detecting any appreciable difference in the chemical composition, provided the ingots were of the size generally used in the manufacture of rails. It was thought, however, that experiments made with ingots of larger size would give different results, and the following particulars will therefore prove interesting: In order to be certain of having appreciable proportions of impurities in the steel, he added considerable amounts of slag and dross to the ordinary charge in the converter, and after the addition of spiegeleisen the blast was turned on for about a minute in order to insure an intimate mixture. An ingot 2.1 m. high, and having a square section of 0.475 m., was then cast, and, after having cooled, two specimens were taken, one at a distance of 0.10 m. from the bottom, and the other at a distance of 0.525 m. from the top. It was found that the metal at the lower part of the ingot was almost perfect in appearance, while at the top it was of a spongy consistency and full of cavities, due, in part, to the contraction while cooling, and in part to the presence of gases. Analyzing the samples taken from the two points, Mr. Snelus found the following results:

| | Top. | Bottom. |
|------------------------|---------|---------|
| Iron..... | 98.374 | 99.038 |
| Carbon (combined)..... | .760 | 3.5 |
| Silicon..... | traces | .044 |
| Sulphur..... | .187 | .044 |
| Phosphorus..... | .191 | .044 |
| Manganese..... | .558 | .514 |
| Total..... | 100.000 | 99.990 |

In order to avoid all possible errors, additional samples were taken and analyzed separately by Messrs. Pattinson and Burrows, who obtained results given in the subjoined table:

| Component Parts. | Top. | | Bottom. | |
|-------------------------|------------|----------|------------|----------|
| | Pattinson. | Burrows. | Pattinson. | Burrows. |
| Iron..... | 98.300 | 98.224 | 99.000 | 99.050 |
| Carbon (combined)..... | 0.628 | 0.560 | 0.350 | 0.870 |
| Carbon (graphitic)..... | 0.005 | 0.000 | 0.037 | 0.000 |
| Manganese..... | 0.604 | 0.666 | 0.535 | 0.462 |
| Copper..... | 0.004 | 0.000 | 0.004 | 0.000 |
| Silicon..... | 0.008 | traces | 0.008 | traces |
| Sulphur..... | 0.129 | 0.150 | 0.040 | 0.012 |
| Phosphorus..... | 0.101 | 0.144 | 0.053 | 0.054 |
| Total..... | 99.933 | 99.858 | 100.061 | 99.684 |

Mr. Snelus then took samples from different points along a line diagonally through a section both at the top and bottom of the ingot. Sample No. 1 was taken from a point near the edge of the section, while sample No. 6 was taken from a point in the middle, and analysis showed them to contain the following proportions of carbon, sulphur and phosphorus:

| No. of sample. | Top. | | | Bottom. | | |
|----------------|-------|-------|-------|---------|-------|-------|
| | C. | S. | P. | C. | S. | P. |
| 1..... | 0.44 | 0.035 | 0.044 | 0.44 | 0.048 | 0.050 |
| 2..... | 0.54 | 0.048 | 0.050 | 0.49 | 0.050 | 0.050 |
| 3..... | 0.57 | 0.080 | 0.08 | 0.41 | 0.048 | 0.054 |
| 4..... | 0.61 | 0.090 | 0.097 | 0.40 | 0.048 | 0.054 |
| 5..... | 0.18 | 0.12 | 0.111 | 0.15 | 0.041 | 0.058 |
| 6..... | 0.171 | 0.185 | 0.144 | 0.171 | 0.044 | 0.058 |

These results confirmed the discovery of Mr. Stubbs, in showing that in the large ingot the carbon, sulphur and silicon accumulated in those portions which remain in a liquid condition for the greatest length of time, leaving an excess of manganese in the other portions. Mr. Snelus then operated on smaller ingots, in order to see whether the same phenomena could be observed. He took one ingot of Siemens steel for sheets and a Bessemer steel ingot for rails, both being cast in ordinary cast-iron ingot molds. The large ingot with which the first-mentioned experiments were made was cast in sand and, consequently, cooled more slowly than the last two. The Siemens steel ingot was 1.05 m. high, the square section at the base was 0.544 x 0.44 m., and the square section at the top was 0.525 x 0.425 m. The Bessemer steel ingot was 1.2 m. high, with a square section at the bottom of 0.325 x 0.325 m., the section at the top being 0.287 x 0.287 m. Samples from both the Siemens and Bessemer steel ingots were then taken at the

respective distances of 0.25 m. and 0.50 m. from the top, and 0.10 m. and 0.09 m. from the bottom of the ingots, and subsequent analysis showed their chemical composition to be as follows:

| | Ton. | | Bottom. | |
|-----------------|----------------|-----------------|----------------|-----------------|
| | Siemens Steel. | Bessemer Steel. | Siemens Steel. | Bessemer Steel. |
| Iron..... | 98.374 | 98.723 | 99.038 | 99.772 |
| Carbon..... | 0.210 | 0.423 | 0.19 | 0.870 |
| Silicon..... | 0.00 | traces | 0.00 | traces |
| Sulphur..... | 0.055 | 0.04 | 0.04 | 0.037 |
| Phosphorus..... | 0.058 | 0.06 | 0.051 | 0.041 |
| Manganese..... | 0.442 | 0.735 | 0.509 | 0.713 |
| Total..... | 100.000 | 100.000 | 100.000 | 100.000 |

These results are almost identical, and show that the distribution of the elements in the small ingots is similar to that found in the large ingots, though naturally in a less marked degree. For a final analysis Mr. Snelus took two samples from the middle of the large ingot, one being taken at a distance of 0.550 m. from the top and the other at a distance of 0.125 m. from the bottom, and after having forged them into bars they were subjected to tensile strain, and it was found that the sample taken from the top had a tensile strength of 76 kg. per square mm., the elongation being 8.8 per cent., while the sample from the bottom of the ingot had a strength of 55 kg. per square mm., with an elongation of 21.8 per cent.

The Mexican Amalgamation Process.

Professor Huntington, of London, England, undertook a series of interesting experiments in 1879, with the view of ascertaining the chemistry of the Mexican amalgamation process, and in a paper recently read before the Society of Chemical Industry, he communicated the particulars of the main points of his invention. He found that mercury worked up with sulphide of silver, chloride of sodium, sand and water extracted about seven-eighths of the silver present, and three times as much as when chloride of sodium was absent. The presence of oxide of iron causes loss of mercury when the mixture contains chloride of sodium, owing to ferric chloride being formed, which is reduced to ferrous chloride by the mercury with formation of calomel. A very little oxide of iron has a very marked effect, as the ferrous chloride, as fast as formed, reoxidizes in contact with the air to ferric chloride, and so on. When, in addition to the chloride of sodium, the mixture was made up with sulphate of copper, which would produce chloride of copper by double decomposition, rather less silver was obtained, and the loss of mercury was greater. However, on substituting the mineral pyrosulphate (silver 65.5, arsenic 15.1, sulphur 19.4) for the artificial sulphide of silver, twice as much silver was extracted by the mercury when the mixture contained chloride of copper. The decomposition of the sulphide of silver is very imperfect, unless the mixture be frequently and thoroughly agitated. Sulphide of zinc, in the presence of cupric chloride, causes the formation of sulphide of copper and chloride of zinc. It is well known that ores containing blende amalgamate badly. A number of experiments were made to establish the action of cupric and cuprous chlorides on sulphide of silver. The generally accepted explanation of the action of the chloride of copper in the Mexican amalgamation process is that one equivalent of argentic sulphide and two equivalents of cupric chloride become one two of argentic chloride + one of cuprous chloride + one of free sulphur. Or that one of argentic sulphide + one of cuprous chloride become two of argentic chloride + cuprous sulphide.

In the experiments made by Professor Huntington it is shown that the liberation of the sulphur is entirely due to a secondary reaction, which takes place only to a limited extent. One equivalent of argentic sulphide + one of cupric chloride becomes two of argentic chloride + one of cuprous sulphide in the primary reaction, while in the secondary reaction one of cuprous sulphide + one of cupric chloride becomes one of cuprous chloride + one of free sulphur. The secondary reaction takes place *pari passu* with the primary at the moment double decomposition is occurring between the cupric chloride and the sulphide of silver, and is brought about by the copper of the chloride concerned in the reaction reducing to a lower chloride a further quantity of cupric chloride, in preference to combining with the sulphur of the sulphide of silver; so that in the result chloride of silver, cuprous chloride and free sulphur are produced. The experiments, as a whole, lead to the conclusion that the amount of cuprous chloride formed and sulphur set free is directly dependent on (a) the strength and quantity of a solvent for cuprous chloride present, such as acetic chloride, (b) the temperature (c) the presence of air. The secondary reaction is limited by the power of the solution to dissolve cuprous chloride. If the cuprous chloride in solution can by any means be removed, the solvent power of the solution will be to a certain extent renovated. The action of the air in facilitating the secondary reaction is, therefore, due to its converting the cuprous chloride into insoluble oxychloride.

In the course of these experiments it was found that when sulphide of silver is treated with a strong solution of cupric chloride at a high temperature (boiling) in a stout closed bottle, cuprous chloride and free sulphur are formed in large quantities. If the heating be continued for some time all the free sulphur disappears, and sulphuric acid is formed. Under similar circumstances sulphide of copper strongly heated with cuprous chloride, air being excluded, yielded sulphate of copper and cuprous chloride, no free sulphur being formed. Sulphur, strongly heated in a hermetically sealed tube with water, produced sulphuretted hydrogen, but no sulphuric acid. When a strong solution of cupric chloride was similarly heated with sulphur, cuprous chloride and sulphate of copper were formed. The next point investigated was the action of cuprous chloride, dissolved in a solution of chloride of sodium, on sulphide of silver. This was a case of double decomposition—one of argentic sulphide, one of cuprous chloride, becoming two of argentic chloride and one of cuprous sulphide. Many erroneous statements have been made as to the action of cuprous chloride.

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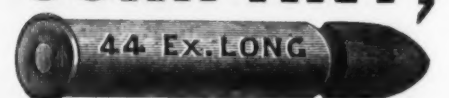
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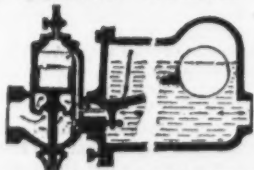
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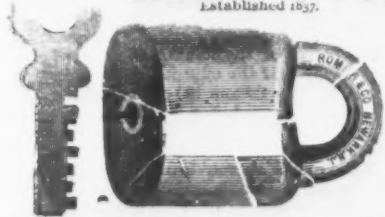
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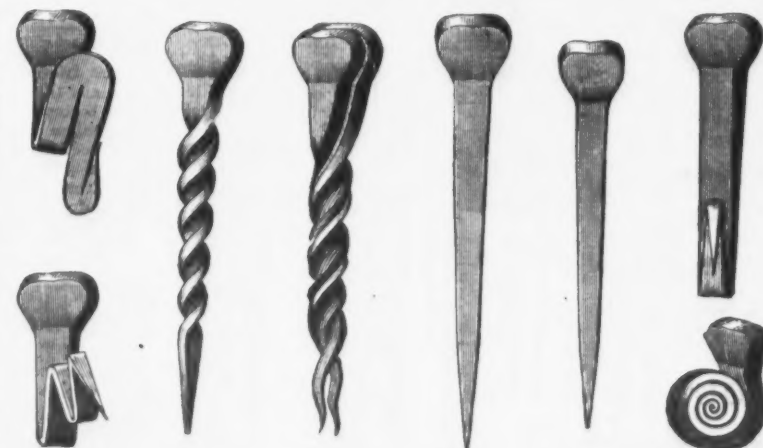
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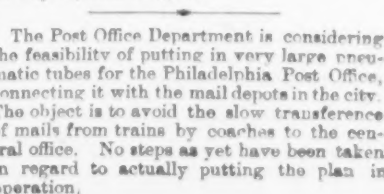
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Labor in the Iron and Steel Industries of the West.

As we announced last week, the misunder-
standing in regard to the meaning of the
Cincinnati agreement has been temporarily
settled in the Cincinnati mills, all the mills,
with possibly one exception, having re-
sumed work under the agreement. It seems
that one part of the complaint of the work-
ingmen was that they were not informed as
to what were the Pittsburgh prices, and
whether the facilities at Cincinnati were
equal to those at Pittsburgh, which they
must be under the terms of the agree-
ment, and a provision was made for the
appointment of a committee on the part
of the association and the manufactur-
ers, who were to act jointly and visit
Pittsburgh for the purpose of arranging
a schedule of prices, or, in other words, to
find out what are actually the prices paid in
Pittsburgh, and in what respect, if any, the
facilities in Cincinnati in the mills are
inferior to those at Pittsburgh. We shall be
surprised if this committee do not find
they have undertaken a very difficult task.
It is questionable if there are any two mills
in the country that have equal "facilities." In
the arrangement of the plant for economy
of labor, in the character of the mills, in the
appliances for easy handling, in the su-
periority or inferiority of motive power, and
in a hundred different ways the mills
will differ, and the question will arise
whether the best facilities that are given in
all mills, taking the best in each, shall be
chosen as standards for comparisons, whether
some one mill shall be taken and its "faci-
lities" made the standards to which Cincin-
nati must conform, or whether the average
of each shall be taken. After this is decided
the question will be what mills shall be taken
or what is the average.

During the past week a conference was
held in Chicago of the Amalgamated Asso-
ciation, followed by a conference between a
committee of its members and the manu-
facturers. The Associated Press dispatches
sent out at the time reported that the con-
vention had determined to ask an advance
in rates and to resume the strike of June,
conveying the impression that the action of
the convention had reference to work in the
iron rolling mills.

There is considerable mysteriousness in
regard to what was done in this convention;
but it seems, in the first place, that it had
nothing to do with prices of what might be
called merchant iron or mill iron, but only
with mills that roll iron rails, and in steel
mills rolling rails, and the convention was to
fix the price for work in these mills for the
ensuing year. What may be termed the
"labor year" in these mills expires Decem-
ber 31, and not May 31, as in the iron mills,
and the constitution of the Amalgamated
Association provides that certain action shall
be taken on these scales the third Monday in
October, and this is probably what the con-
vention considered. Just what their action
was seems also to be in some doubt. The best
information we have been able to obtain is
that the association consented to—in fact,
proposed—a reduction of 12½ per cent. in
the price of work, and the manufacturers
demanded 20 per cent. A conference was
held on the 19th, but no conclusion was
reached. The manufacturers considered the
reduction proposed by the men insufficient,
and the conference adjourned to the 30th.
The action of Mechanics' Lodge, demand-
ing the resignation of President Jarrett,
does not appear to have met with a very
favorable response among the iron workers.
The Chicago Convention, above referred to,
took very decided action in favor of Mr.
Jarrett, expressing their confidence in him,
denouncing the attack as cowardly and un-
justifiable, promising him hearty and honest
encouragement and support, and demanding
the trial and expulsion of Mechanics' Lodge
from the association. We of course are not
sufficiently conversant with the workings
of the Amalgamated Association to know
whether the expression of an opinion on the
part of a lodge is sufficient to justify its ex-
pulsion, but if it is, it is simply another ex-
ample of the disinclination on the part of
unions to allow free discussion and freedom
of opinion among its members. This is one
of the evils of unionism that must be re-
moved, and that its best friends desire to see
removed, in order that it may secure the best
development and be of the greatest use and
advantage to its members.

We notice that our English friends are
complaining somewhat that they have not
reaped as much benefit from the recent
great strike in the iron trade as they ex-
pected. They are especially disappointed that
their orders for hoop and tank iron did
not reach the aggregate that they hoped.
They based large calculations upon our as-
sumed necessities, and these have not been
realized. A few hundred tons of hoops and
a few hundred tons of plate iron for tanks
have been ordered and have been and are
coming forward, but the total was not
near what it was believed would be
reached. There were several reasons—one
was the uncertainty as to the duration of
the strike, and the probability that when it
was ended iron could be procured in abun-
dant, and also at a price the same or a
little less than English iron could be laid
down for in this country, duty paid.
Another hindrance to orders has been the
advance in freights to this country, which
is checking business considerably. These
have been as high as 15¢ a ton for pig iron
from the Tyne.

Echoes of the Strike.

When the Amalgamated Association was
formed out of the various organizations that
before existed in the iron trade, it seemed
perfectly evident that with such a diversity
of interests as it brought together the time
was not far in the distance when it would be
impossible to harmonize. The more com-
plete the amalgamation became, the more
trades that were brought within its scope,
the more elements of dissatisfaction and the
more inevitable the dissension. Though dis-
sensions were not before unknown in the
association, they were developed and as-
sumed a proportion never before known dur-
ing the strike that has just ended at Pitts-
burgh. The fact that such dissensions
existed during the strike was no secret.
Indeed, a number of the members of the
Amalgamated Association seem to have taken
no pains to keep it secret, and while the pud-
dlers were doing all in their power to con-
tinue the strike and force the other members
to persist in a demand that most of them
believed was unwise and ill-timed, the fin-
ishers and others made no secret of their deter-
mination not to be forced to continue the
strike without limit at the beck of the pud-
dlers.

It has been asserted that the trouble in
the association came from the finishers.
Prior to the close of the strike steps were
taken to organize an association of finishers
that should include only the heaters and
rollers. A finishers' association has been
organized, but it does not seem to have
euded in a split, though the fact that such
an organization has been formed is an indi-
cation that the finishers are not entirely sat-
isfied with the action of the Amalgamated
Association, and purpose to have a body
that can take care of itself. The Amalgam-
ated Association, in its column in the *La-
bor Tribune*, has this to say about the new
organization:

Much has been said of late regarding a new
organization that was being formed among the
rollers of this city, the valleys and Wheeling.
Many of the members of the Amalgamated
Association look upon it as the initiatory step to a
"split" from the society, but it is not so. We have
investigated the matter fully, and find that while
the rollers have organized a "protective associa-
tion" they have done so with no intention of
withdrawing from the Amalgamated Association.
At the meeting to organize the new society the
subject of organizing a separate society and with-
drawing from the A. A. was fully ventilated. A
few were in favor of the latter scheme, but the
number who were and are still in favor of stand-
ing by the A. A. was so large, and they were so
emphatic in their declarations to have nothing to
do with the new society if such were its object,
that the subject was dropped. Therefore no fears
need be entertained in regard to a "split."

It seems now, however, that the dissatis-
faction of the puddlers over their failure to carry
the association with them in their demands
has resulted in a still more serious trouble
than that which the finishers promised to
make. A Pittsburgh lodge made up largely
of puddlers has, it is reported, recently taken
action looking to a withdrawal from the
Amalgamated Association. The attack of
this lodge seems to be mainly on President
Jarrett, whom it accuses with being vacillat-
ing, inconsistent, timorous, delinquent in his
duties and overly sensitive of his personal
dignity; claims that he allowed dissension and
was "not for or with us." With these
assertions the lodge asks President Jarrett
to resign and invites other lodges to join in
the request. The sentiments of the lodge
have been embodied in a circular, a copy of
which has been sent to every lodge in the
First District. That circular reads as fol-
lows:

PITTSBURGH, SOUTH SIDE, Oct. 9, 1882.
BROTHERS: In accordance with instructions of
Mechanics' Lodge, No. 23, Pennsylvania, I hereby
inform you of the action taken by its members at
our last regular meeting, in reference to the result
of the strike. Brothers, believing as we do now,
that were it not for the vacillating and inconsis-
tent actions of President Jarrett in conjunction
with a few cowardly, cringing finishers, who would
sacrifice all principles of manhood at the behest
of their employers, that the strike would termi-
nate in our favor. Brothers, it is quite evident
from the action taken by President Jarrett at the
 inception of the strike and persistently main-
taining that attitude to the end, that he was not
for us or with us; he allowed dissension in our
ranks by indulging and encouraging finishers' meet-
ings, knowing perfectly well that such meet-
ings were detrimental to the successful issue of
the strike. If President Jarrett were not so timor-
ous and delinquent in his duties, and so sensitive
of his dignity as to break his word by saying that the
puddlers were not entitled to \$8 per ton, the strike
would have ended favorably to us long since.
Now, brothers, in view of these facts, and taking
everything into consideration, we intend to hold
President Jarrett to his word; he said at the last
convention on the Pittsburgh side, at the request of ten
lodges he would step down and out. Mechanics'
Lodge has taken initiative steps in demanding his
resignation by a unanimous vote of the lodge.
Believing that it will be for the benefit of the
organization in general as there are hundreds
who will not pay to the National Lodge as long as
he is president, Brothers, we submit this for your
consideration, and let us know in due time what
action you have taken.

JOHN O'BRIEN, Cor. Rep.

We have no desire nor intention of defend-
ing Mr. Jarrett; he is abundantly able to do
that himself, but this attack is evidence of a
fact that has been well known in connection
with labor organizations, that any one who
dared exercise independent judgment, that any
one who believed a certain course was
wrong and had the manliness to say so, was
immediately a marked man in the lodges—
even though his expression of this opinion
was confined to the lodge itself. One of the
charges against Mr. Jarrett is that he allowed
dissensions. In other words, the right not
only of free opinion but of free speech is
denied in the lodges. In some respects there
never was a tyranny on the face of the earth
that equaled the tyranny of trades unions.
They demand unhesitating, unquestioning

obedience to their behests, not only in word,
indeed, but in thought; honest difference of
opinion is not tolerated, and a man who
dares express an opinion in a lodge room or
in a conference meeting differing from that
which is held by the loud-mouthed and blat-
tant members, if he is not immediately
hooted down, is regarded with suspicion. It
is not conceded that a man can be favorable
to labor unless he is in favor of everything
labor does, be it right or wrong.

There is another feature of the above that
is worthy of note, and that is the fight for
\$6 is not at an end, and in the near future
the puddlers will make the demand again.
In view of this fact we presume that the
association of manufacturers, which was so
potent in holding the manufacturers together
in their refusal to grant the demand of the
puddlers in the past and in bringing the re-
cent strike to a successful issue for the man-
ufacturers, will be maintained in all of its
force.

Trade Unions and Fluctuations in Selling Prices of Goods.

Those who as manufacturers have had to
do with strikes for the past few years can-
not have failed to notice the influence that
strikes, the fear of strikes, and the more
complete organization of labor into trades'
unions, have had upon variations and fluctua-
tions in the price of manufactured articles.
The tendency of trade unionism and strikes
is, as the rule, toward higher rates of wages,
and these, within certain limits, involve ad-
vances in prices. Of course, through reduc-
tion in interest rates and improved modes of
manufacture, higher wages, within certain
limits, might be paid without a necessary in-
crease in the selling price of products; but
when these limits are exceeded an increase
of wages either means an impairment of
capital or an increase in the price of goods.
If the former, manufacturing ceases; if the
latter, consumption is rapidly reduced, and,
by reciprocal action, prices must be reduced,
and with them the price of labor. On the
other hand, when the price of goods advances
under any influence, there is immediately,
and, in most cases, justly, a demand on the
part of the men for increased wages. Their
organization is now such that they are aware
of any advance in price almost as soon as
it occurs, which was not the case a few years
ago. Then a manufacturer might secure
higher prices for his goods, enough higher to
justify him in paying higher wages, and still
succeed in keeping the information of the
advance from his workmen, or the circum-
stances would conspire to keep this informa-
tion from them without any attempt on the
part of the manufacturer to do so.

Of course, when the state of the market
is advancing, and the tendency and prospect
of the future is that, for a time at least, this
advance will continue and advanced prices
be maintained, there is no hesitation on the
part of the manufacturer to advance the
price of his goods and pay advanced wages.
On the other hand, when, under the influence
of some special circumstances, slight advances
are made without any reasonable probability
of their being sustained for any length of
time, or when, with a constantly advancing
market, the judgment of the manufacturer
tells him that the limit is very nearly reached
and any further advance might result in a
reaction, there is then developed a decidedly
conservative feeling regarding these ad-
vances.

In making these broad statements we have
simply put in form certain well-known econ-
omic truths, but the important point to
which we wish to attract attention is the
influence that labor has had in this conserva-
tive feeling. No one who has had to do
with the advances in prices that have taken
place in the last few years can have failed to
take into serious consideration, as never be-
fore in the history of manufacturing, the
question of what the effect of an advance
will be on labor. There is no doubt that
many a time when slight advances in the
selling price of goods could have been made
and maintained for a while, it has been
deemed best not to make them, but to con-
tinue selling at the old rates, simply because
it was believed that such advances might
only be temporary, and especially because it
was believed that they would make labor
dissatisfied and lead to disturbances, if not to
strikes, which in the end would cost more than
any benefit to be derived from the advance.
It is a well-known fact that at the time of the
"boom" in iron, and when prices were be-
ing rapidly advanced by the Western and
other iron associations, the advances were
very much deprecated by some of the best
and shrewdest men, who foresaw the result
would be to put the prices to a point where
they could not be maintained and lead to
demands on the part of men not working
under sliding scales, and thus the advances
be a decided detriment to the trade. Their
judgment was correct. It was this experi-
ence that, after the reaction came and the
new era of advance set in, led to such con-
servative action on the part of the Western
Iron Association.

It is impossible, of course, to give exam-
ples in any great number of the fact we
have stated, but there is no doubt the present
organization of labor has a conservative in-
fluence in maintaining prices, that it is in
some senses a guard against fluctuations, and
holds the market steadier than would be
were it not for the union—we do not, of
course, mean to imply that this action is
wrong—indeed, we insist that to this extent
the tendency of unions is beneficial.

Accidents to Workmen.

The proportion of accidents in manufac-
turing operations is probably much greater
than is generally supposed, but as compara-
tively few are very serious it is extremely
difficult to compile the statistics, the facts
not being reported. In Europe it is different.
A recent "Monatshefte zur Statistik des
Deutschen Reichs" contains an interesting
census of accidents that occurred in all the
factories and manufacturing establishments
throughout Germany during the months of
August, September, October and November
last year. The inquiries extended over
93,554 shops and factories, employing 1,615,
253 workmen and 342,295 women—in all,
1,957,548 individuals. Of these, during the
four months, 662 were killed, 11 of them
being women. In addition, there were 123
rendered completely incapable of work, while
427 were partially, though permanently, in-
capacitated. Temporary loss of work through
accident happened to 27,644 men and 708
women, the total number of those who had
suffered being 29,574. Taking this calcula-
tion for the year (although it should not be
forgotten that accidents fluctuate ac-
cording to the time of year), the total would
be 88,722, or about 45 per 1000. A further
report tells us that out of the 28,352 in-
valued during the four months, 16,139 caused a
cessation of work amounting to 126,340 days.
In this category being included the stoppages
from one to 14 days; 6532 came within the
second category of from 15 to 28 days, caus-
ing an aggregate loss of 135,666, the third
category embracing all sufferers over 28
days, included 5681, causing a loss of 287,913
days. The total loss of days in the four
months was 549,559. Among the industries
that figure in these accidents the greatest
number of fatalities was experienced in coal
mines, which employ (not including women)
187,522 workpeople, in which the number of
mortal or totally-incapacitating accidents
were 292; iron and steel works, employing
115,158, showing 86 accidents; machine
shops, employing 161,069, with 77 accidents;
quarries, employing 47,037, with 64 acci-
dents; building works, employing 44,221,
accidents 57; mills of various kinds, em-
ploying 70,103, accidents 57; sugar mills,
employing 44,402, accidents 56, &c. Classi-
fying the occupations according to degrees
of danger and the number of fatal accidents,
we find that the mines are the worst, and to
them succeed building works, chemical
works, distilleries and sugar beet mills, quar-
ries, works for lighting and heating (gas),
saw mills and wood works, machine works,
metal works, paper mills and tanneries, tex-
tile factories, printing and photographic
establishments.

From such figures as these it would per-
haps be natural to argue that in view of the
constant danger which attends working in
nearly all trades, employers should be held
to a much stricter accountability than they
now are for death or personal injury suf-
fered by their workpeople. It may be that
this conclusion is in some sense warranted,
but when governments begin to interfere in
this matter and to enact laws in a senti-
mental way, they are usually prompted to do
so by a great deal of a false quality of
sympathy for the unfortunate people who
are hurt in earning their daily bread. It is
within the truth to say that no care or fore-
sight on the part of an employer of labor
can protect his workpeople against the con-
sequences of their own carelessness or reck-
lessness. To save themselves a little trouble
or a few steps, men will often take risks
which invite death or injury. Men become
indifferent to danger, and if there are two
ways of doing a thing, one safe and easy,
the other dangerous and easier, they will,
in a majority of cases, choose the
latter. We think that the most
which can be expected of an employer
of labor is that he should make the right
way of doing whatever is to be done in his
place, the safe way, and that, with full
knowledge of the fact that safe provision
has been made, his workpeople still persist
in imperiling their lives, they should have
no recourse against him for the consequences
of their "contributory negligence." It is
an absurdity to say that an employer should
be required to protect his labor from the
consequences of deliberate violations of his
rules, or that his works should be so equip-
ped with safeguards that a man cannot get
hurt in them if he wants to. To do this is
beyond the range of human ingenuity; for
men who are disposed to be careless of their
personal safety will circumvent the most in-
genious safeguards. If the miner in a fiery
mine will deliberately, and with full knowl-
edge of the possible consequences, open his
safety lamp to light his pipe by the naked
flame, he would not be benefited if his em-
ployer should provide him with a lamp
lighted and locked above ground. He would
fill his pocket with matches. If searched for
these he would devise some way of lighting
his pipe which would entail the danger
which was sought to be avoided.

There will be held at the Turf Club The-
ater, Madison avenue and Twenty-Sixth
street, in this city, a joint session of the
American Institute of Mining Engineers,
American Society of Mechanical Engineers,
and the American Society of Civil Engineers,
on Wednesday evening, November 1, at
which a memorial on the life and works of
the late Alexander Lyman Holley will be
delivered by Rossett W. Raymond, Ph. D.
The joint committee representing the three
societies are very desirous that all who are

Holley's friends and admirers, whether members of the society or not, should be present at the meeting. While so far as they have been able to obtain the addresses of those interested invitations have been sent, yet they feel certain that a large number cannot be reached in this way, and are solicitous that all, whether invited or not, shall come. The meeting will, no doubt, be an exceedingly interesting one, and Professor Raymond's address will be a treat to all who are fortunate enough to listen to it.

Guaranteed Plates from the Dealers' Standpoint.

We invite those who import and sell tin plates to consider with us, calmly and dispassionately, the question of guaranteeing as a business proposition. We will discard all sentimental considerations and avoid, if possible, saying anything which will excite ill-feeling or cause the dealer, who is jealous of his business reputation, to feel that he has been unjustly impeached. For our own part we approach the discussion without prejudice and with no quixotic notions that the consumer is the victim of colossal and systematic fraud or that he needs a doughty champion who will not hesitate to break a lance even against a windmill. For the present we will leave the consumer wholly out of consideration and look at the matter from the dealer's standpoint exclusively.

It is a matter of experience with a large proportion of tin-plate consumers, that it is difficult to obtain satisfactory plates by ordering by brand. It is not denied that there are good plates in the market; it is not questioned that among the importers and dealers there are many conspicuous examples of personal integrity and business honor. It is admitted, for all we know to the contrary, that, within the limits of their knowledge, the reputable and responsible dealers of the country are to be trusted implicitly. But the system under which plates are sold is not satisfactory, and does not meet the wants of the trade. Why it does not we have said so often, and the dealer knows so well, that we not consume more space in telling him. That it does not is very clearly shown by the fact that there is not a tin-plate house in the trade whose customers are not asking for gradings and guarantees. If they had reason to be satisfied with the present system, they would not ask for another; and if they want another, no one will question that it will be good business policy on the part of the dealer to give it to them. To satisfy his customers is the wisest thing a business man can do.

Having this object in view, we ask the dealer to offer the consumer graded plates, with a quality guarantee based on actual inspection and test. No doubt, many of them consider this an unreasonable demand, and honestly question its desirability and practicability. We shall try to show them that our suggestion is entirely reasonable; that it can be acted upon without serious trouble or expense, and that to satisfy every proper demand of the dealer, and remove all ground of just complaint against the existing system, is not only easily possible, but eminently desirable. We say this believing that a majority of the importers, and dealers desire the best interests of the trade, and that they will gladly protect their customers, if they can clearly see the way to do so without entailing burdens upon themselves which seem greater than they can carry.

A reform closely parallel to the one we are seeking to bring about was accomplished several years ago in this same trade as the result of a stormy agitation. We refer to the reform in solder manufacture. Every metal house of consequence now offers the trade guaranteed solder which is just what it purports to be, and this guaranteed solder is largely—indeed almost exclusively—used by the better class of consumers, who are glad to have it at a higher price than solder not guaranteed, and presumably inferior, is offered for in the market. The causes which brought this about were very similar to those now operating to induce the adoption of the guarantee system in tin-plate transactions. At the time referred to the country was so completely flooded with composition and patent metal solders that it was practically impossible for a tinner to obtain a satisfactory article. What was known at that time as a No. 1 solder was as far from being a first-class article as a "best charcoal" plate is to-day from being the best of its kind. As the final result of numerous complaints addressed to metal houses from the trade at large, an enterprising and progressive establishment put upon the market a solder bearing its own brand, and which it guaranteed to be strictly "half and half." Consumers generally, after wandering through the mazes of inferior solders bearing high-sounding names, to which we have referred, and of compounds made by recipes which were peddled over the country by itinerant vendors, the principal ingredient of which was tea lead, were only too glad to obtain a first-class article, and the house whose sagacity thus placed it in the front rank reaped a fair reward for its enterprise. It sold its guaranteed solder at a very handsome profit and enjoyed a monopoly of the business until other concerns, seeing the drift of affairs, commenced also a system of guaranteeing. These facts are so well known to both jobbers and consumers that a mere allusion to them is sufficient for our purpose. As we have already stated, at present there is scarcely a house in the trade that does not

sell guaranteed solder. The tinner is able not only to buy a strictly half-and-half article, but can even go further and buy what is called "extra fine solder," in which tin is employed in excess of lead. The sale of refined metal solder, patent solder, No. 1 solder and other brands that might be mentioned, has steadily decreased. They have not been driven from the market, for they still have their legitimate uses; but it has become possible for the tinner to discriminate against them when he requires something else. He is now able to buy just the grade of solder he requires for any specified purpose, which it was not possible for him to do formerly.

The parallel between the solder trade and the tin-plate trade must be apparent to every intelligent man. The solders which were on the market ten years ago, and against which the trade so loudly complained, pretended to be what they were not. Tanners, at least those who learned their trades twenty or twenty-five years ago, know good solder by using it, and appreciate good tin plates by working them. Hence it is that complaints so frequently take the form of comparisons of the goods sold at the present time with those which were in vogue formerly. Accordingly, when a solder was offered which in use proved to be granular, lacking proper fluidity and hard to melt, and withal produced a weak, dauby joint, accompanied by the dealer's assurance that it was a good article and "equal" to half and half, although its appearance in the bar was all that could be desired, they knew that either the dealer was ignorant of the goods he was selling or else was deliberately attempting to deceive. The difference in price in their favor, which, as is customary in such cases, was made the most of as an inducement, was no satisfaction. The solder was poor and altogether unsatisfactory. They knew it, and the fact that everything else had disappeared from the market did not reconcile them to the situation at all. The question was constantly asked, "Why can't we buy solder at present equal to that we were 'used to when we were learning our trades.'"

Every difficulty of this character produces its own relief. Tanners commenced making their own solder. The manufacture of solder is a simple thing, and the art was formerly a part of every tinner's trade, accordingly there was no great difficulty in this direction. So things went on until one of the metal houses, as we have mentioned, had the sagacity to see that tanners really wanted a different article from what had been forced upon them for years, and thereupon undertook to furnish guaranteed solder.

The difficulty at the present time is very similar. Tanners everywhere, for years past, have been complaining that they are unable to buy the quality of plates they want. When they need a first-class article, regardless of price, there is shipped to them in many instances something bearing a name that sounds well, but the boxes contain wasters as well as perfect sheets, and the plates are frequently otherwise unsatisfactory. When they order something that will double seam, instead of receiving an article known to be according to specification, a choice "brand" is shipped, which seldom, if ever, is in quality what was wanted. Accordingly, there is a well-grounded feeling of dissatisfaction—not that there are no good plates in the market, but that there are so many pretending to be good which are not good, that it is difficult to get the good at all; not that there are no honest houses in the trade, but that the general system of business is such that the best houses find it impossible to give satisfaction in all cases.

What consumers of tin plates demand is that such a system shall be inaugurated as will enable them to get exactly the kind of plates they require for specific purposes. When they desire a first-class article they want to be certain of getting it by simply specifying the want. When some other grade is demanded they require to be equally certain of getting exactly what they specify. The element of chance must be eliminated. The necessity of shipping back must be avoided. The demand is for reliability at every stage. Dealers must know what plates they are shipping, as much as they now know the quality of their solders. Tin-plate dealers have been blind to their own interests, or they would not have permitted this thing to go so far. Tin is being discriminated against on every side. Consumption has really been reduced of late years because of the general unreliability of the plates sold in this country. We are safe in saying that four-fifths of all the architects in the land are at present opposed to the use of tin roofs on good buildings simply on the score of quality, and specify them only on cheap structures, and where price is the sole consideration. This is not as it should be. Roofs of the quality laid 30 years ago are still good, while those laid during the past 10 years are constant sources of complaint. We might cite other facts showing the same result, and all proving that the present policy is tending to drive tin plates out of use for everything in which quality and durability are considered. It is time that such a reform was instituted as will give tanners the quality of tin plates they are demanding, and which they best know how to use properly.

It is an easy matter for the dealer in tin plates to give the consumer all that he has any right to demand—namely, plates adapted to his requirements at prices which are fair. It does not follow that the importer is thereby under the necessity of opening every box and inspecting every plate. It will pay

him to do so to the extent of keeping his stock of plates which can be guaranteed in their respective gradings up to the requirements of his customers, be these more or less. For much less than a proper and reasonable charge for his guarantee would return to him, he can pay the expenses of such inspection and grading, including the salary of an experienced tin-plate worker, who knows in a practical way what a tinner wants when he orders plates for a particular use. This talent can be hired without difficulty, and unskilled labor can do the handling, packing and marking. To avoid confusion and establish uniformity in prices, the dealer would naturally prefer, we should think, to have four or more grades—at all events, a specific number—so as to relieve himself from any responsibility for tins purchased by brand outside these gradings. He would naturally have as many grades as would represent the general classifications adapted to the principal uses of the tin shop, and by announcing what they were and what the letter, number or name of each grade represented, would enable the tinner to do what he is not now able to do—to order intelligently and with the assurance that the dealer will know what his order calls for. The great mass of the untrustworthy unequal plates put up and handled by irresponsible makers, may be left to take care of themselves; so also may the choice standard brands which are wanted on the strength of their reputation. The new system will simply add to the machinery of exchange between dealer and consumer a convenient means of understanding one another—the seller agreeing to deliver what he offers, and the consumer knowing what to call for and feeling confident he will get it.

This, as we have said, is a plain, straightforward business proposition. It rests on a basis of fair dealing, and will meet every requirement of the trade. It will enable the dealer to say, "You may purchase what you will from my stock on your own judgment, but I can offer you plates which I know are all prime and of the quality I represent them, and if you want these 'selected plates on my guarantee you will probably do better than you can by trusting 'to brands.' Presuming that such guarantees are honestly and intelligently given, as we know they are in solder and believe they would be in tin plates, there would no longer be any better ground for complaints about tin plates than there now is about solder. The dealer's guarantee would settle the whole matter, for he would not sell his reputation for a dishonest profit.

The "Soaking Pit" Process.

Mr. Gjers's paper on the rolling of steel ingots with their own initial heat, read at the Vienna meeting of the Iron and Steel Institute, is given in extract in another place. The new mode of treating steel ingots, so as to utilize the stored heat which is retained in their interior for some time after pouring, as practiced at the present time at the Darlington Works, in England, is fully described. There can be no question as to the value of any metallurgical process which will actually save one heat in the finishing of the product, nor as to the desirableness that this object be gained in the exceedingly simple and inexpensive way suggested in this paper.

From a letter of Messrs. Pattison & Stead referring to the subject, it would seem that the process is a success, thus far at least, at the Darlington Works. Unfortunately, our American practice has thus far failed in giving such favorable results. The fore-warming of the "soaking pits" by means of hot ingots evidently necessitates their reheating, at least before rolling. The paper does not state the number of runs required to make the pits ready for operation, nor does it seem to give sufficient consideration to the cost involved in changing machinery so as to be able to finish in one heat.

Nevertheless, the new process described is well worth consideration, and even a full trial, and if it proves to be all that is claimed for it, there is little doubt of its prompt adoption in our own practice.

Cast Iron Controlled.

A circular headed as above, and issued by Mr. F. H. Jackson, of San Francisco, Cal., formerly of the Building Department of this city, is before us. The object of it seems to be the introduction of a cast-iron girder made in sections, or rather in panel-lengths, to supersede the present style of girder used in supporting the front of buildings, and which is cast in one piece. The purpose of this is, evidently, to reduce the tensile strains, to which the cast iron in a continuous segmental arch girder is subject, to a minimum by applying the principle of the *voussoir* arch to cast-iron construction. We quote from the circular as follows: "A summary of the peculiarity of this arch is as follows: It is in effect a device for employing cast iron compressively, neutralizing the tensile strain due to transverse strain. The tensile strain on the rods is reciprocally utilized in compressive resistance at the intrados of the arch, thus destroying tensile strain in every part of the cross-section."

Without going into further details or any lengthy discussion of the subject, we will simply say that Mr. Jackson's composite cast-iron girder is undoubtedly an improvement on the present style of cast-iron girders used in the fronts of large buildings, and deserving of a full and fair trial by architects and builders. But when Mr. Jackson, with all his experience in testing iron, deliberately states that "the tensile strength of average

wrought iron is 60,000 pounds to the square inch," our curiosity is naturally excited, and we would like to know where he ever found wrought iron that averaged so phenomenally. So, also, would we like to find out how Mr. Jackson found that cast iron in compression members of from 15 to 20 diameters in length, would resist 93,000 pounds per square inch! Now, Mr. Jackson evidently has a good thing—an undoubted improvement upon the cast-iron girders in use—and if he will only not permit the enthusiasm of the inventor to run away with his naturally good sense and sound judgment, and stop talking of building "300 feet span and over" railroad bridges on his "new principle," we shall be pleased to add our congratulations and good wishes for his prosperity to those of his many other warm friends whom he left behind in New York.

An Iron Master on the Protection of Native Ores.

The following letter from Mr. James A. Burden will be read with interest:

TROY, N. Y., Oct. 6, 1882.

Hon. Smith M. Weed, Plattsburgh, N. Y.—DEAR SIR: I am in receipt of your letter asking for my views about an increase upon the present rate of duty on iron ore. You refer to statements made by certain parties that there is an insufficient supply of iron ore in the United States, east of the Allegheny Mountains, suitable for the manufacture of Bessemer steel, to meet the requirements of the Bessemer steel works located in this section of the country. I venture to say that the authors of this statement have arrived at this conclusion without sufficient investigation. I regret I have not the time to enter into a full review of all the Bessemer ore deposits of the East. I think, however, it will be sufficient if I show to you, as I shall endeavor herein to do, that one Eastern ore company alone is able to supply far more than all the ore required, excepting for spiegeleisen, by all the Bessemer steel works east of the Allegheny Mountains. I refer to the Chateaugay Ore and Iron Company. The mines of this company were first discovered about the year 1864, and mining operations were commenced on a small scale in the year 1869. The quality of the Chateaugay ore for Bessemer purposes and high-grade steel, is unsurpassed by any imported or native ores used in the production of Bessemer steel in the United States. It is very low in phosphorus—frequent determinations of phosphorus made in the chemical laboratory of our works, show an average of this element in the Chateaugay ore used by us during the past 12 months, to be twenty-nine one-thousandths of 1 per cent., and the average of phosphorus in the whole production of the Chateaugay mines, as shown by the determinations of the Chateaugay Company's chemist during the same time, is twenty-one thousandths of 1 per cent. As good a quality of Bessemer steel can be made from the Chateaugay ore alone as from the best ores of England, Spain or Africa. With the exception of the great deposit of iron ore in the North of England, known as the Cleveland deposit, the Chateaugay deposits are probably the most extensive continuous veins yet discovered, and the production of the Chateaugay mines is practically limited only by the men and machinery employed in its mining operations. It is well known that the great Cleveland deposit is high in phosphorus and not suitable for the manufacture of Bessemer steel (as is the Chateaugay ore) by the acid process, which is the one used by all the Bessemer steel works in the United States.

The Chateaugay Company have already opened two parallel veins of this Bessemer steel ore upon their property; one of these veins averages 18 feet thick, and the other 16 feet thick. One of these veins has been opened continuously, and is now being worked on its outcrop (which has only a few inches of cover) for a distance of about 1½ miles, and this vein has been traced continuously on the company's property for a distance of about 5 miles. The distance between two important workings at the present time on this vein is about 3½ miles, and the company have other veins which have not been traced or examined.

This property alone, from the veins already explored, is capable (in the opinion of a competent authority who has had the experience and the opportunity to judge of its resources) of producing 6,000,000 tons of Bessemer steel ore per annum. While this is the maximum output of the mine, yet, for the purpose of my argument, I will assume the possible output to be only one-half of this quantity, which is certainly making a liberal allowance for "faults" and other irregularities in the deposits. I therefore call the possible annual output of the Chateaugay mines 3,000,000 tons, 2 tons of which will make a ton of the highest quality of Bessemer pig iron; and should an iron ore higher in metallic iron than this be in demand, the Chateaugay Company could supply a 52 per cent. ore or a 60 per cent. concentrated ore, of the quality above referred to. Judging from the production from the first of January to the first of September, 1882, I estimate that the production of the Bessemer steel works, east of the Allegheny Mountains, for the entire year of 1882, will be about 690,000 tons of finished Bessemer steel, of all kinds, including rails—which would require about 820,000 tons of pig iron in its manufacture; and to produce this amount of pig iron, about 1,640,000 tons of Chateaugay ore would be required. Assuming the annual output of the Chateaugay mines to be 3,000,000 tons, as already stated, it will be seen that the Chateaugay Ore and Iron Company alone can supply 1,300,000 tons in excess of the total quantity required for Bessemer steel purposes, east of the Allegheny Mountains. I estimate that the product of all the Bessemer steel works in the United States, for the year 1882, will be about 1,800,000 tons of finished Bessemer steel of all kinds, including rails, which would require in its manufacture about 2,050,000 tons of pig iron; to produce this amount of pig iron, 4,100,000 tons of Chateaugay ore would be required, or only 1,100,000 tons in excess of a possible output of the Chateaugay district.

It may be asked whether this ore can be mined and sent to market at a price which will bring it within reach of the ore consumers. It is a sufficient reply to this that the Chateaugay Ore and Iron Company is now delivering its ore to its customers at \$3.50 per ton of 2240 pounds, at Plattsburgh, on Lake Champlain, and guarantees that 2 tons of the ore will make 1 ton of pig iron. The freight from Plattsburgh to tide-water on the Hudson is \$1 per ton of 2240 pounds, and from the Hudson low rates of freight by water can be had to Pennsylvania, New Jersey and other iron-making districts.

I cannot, within the scope of this letter, review the advantages to the ore consumer of a home supply of ore; but as an illustration of the risk of depending upon a foreign supply, I would refer to the case of the "Carlist War" in 1874 and 1875, when operations were interrupted at the Bilbao Mines, which exported to all countries, in 1881, 2,500,000 tons of ore. Fancy the condition of this country with its ore mines undeveloped, its steel works dependent on foreign countries for their supply of ore, and we at war with a foreign naval power.

During the coming year the Burden Iron Company will use nearly three times as much pig iron as it will make, and my interest in manufacturing pig iron into the finished products of iron is more than ten times as great as my interests in iron ore mines. Therefore, I do not speak as an ore producer. A manufacturer who intended to be in the iron business but a short time, might be in favor of a merely nominal duty on ore, as at present, and protection on his finished products of iron and steel, but as I expect to continue in the manufacture of iron, and hope that my children may succeed me in the same business, I am in favor of increasing the present rate of duty on iron ore to a rate somewhat in proportion to the present rates of duty upon the finished steel and iron, in order to encourage development of the ore deposits of this country, and to build up home competition in iron ore.

Yours truly, JAS. A. BURDEN.

WASHINGTON NOTES.

(From Our Own Correspondent.)

WASHINGTON, D. C., October 25, 1882.

THE METROPOLITAN INDUSTRIAL LEAGUE.

The efforts of the Metropolitan Industrial League, reference to which was made in this correspondence some weeks ago, to secure united, comprehensive and harmonious action on the part of the great industries of the country before the Tariff Commission, and to facilitate their labors in presenting to Congress and the country a tariff based upon economic conditions and the interest of home industry and labor, are meeting with continued and increased success. Among the documents submitted to manufacturers throughout the country is a digest of the tariff conditions, laws, schedules and dates of the United States, with revisions, defined and arranged so as to facilitate the parties addressed in considering the subject, with columns of specific and ad valorem rates of duty, of the average ad valorem rate paid last year, and a blank for the minimum rate that the interest referred to requires. The information desired is requested to be noted on the margin, showing what revision the industry named requires or admits from the following standpoints: Whether in clearer expression of law, in classification of the article, increase or reduction in rate of duty; whether a specific or ad valorem system applies best to the fluctuation values of the articles entering into the industry affected in lieu of the present compound system; whether any and what articles should be added to or dropped from the schedule or free list, and whether any and what points of the present tariff have caused the industry named complication in any way.

It is understood from information received here that the replies to these interrogatories are coming in rapidly. It is proposed upon the return of these forms, with specifications from manufacturers, to average and adjust the same with data, otherwise obtained and at hand, and from that arrange a complete tariff—laws and schedules—so revised in equity for submission to the league, for its adoption and presentation to the Tariff Commission as a basis of tariff revision.

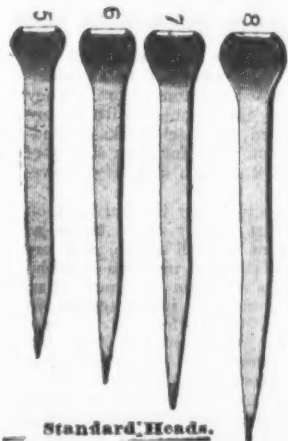
Dr. B. Joy Jeffries, of Boston, recently spoke at the Massachusetts Institute of Technology on the standard colors of marine and railroad signal lights. He described some very valuable improvements in signal glasses which were being made by the New England Glass Works, and which had resulted in giving a green light of unusual brilliancy and perfection. While this is a great step in advance, and will no doubt, wherever the glass is used, tend toward the diminishing of accidents, we do not believe that a signal-light system ought to depend upon colored lights. It certainly ought not at sea, where the lights upon which we depend for ascertaining the vessel's relative position must, so long as we burn ordinary oils in common lamps, give us a less brilliant light than can be obtained with uncolored glasses. We have yet to see in New York harbor a single pair of colored signal lights where the green light is equal in brilliancy to the red light, or where either of them at all approach the brilliancy of the masthead or any other uncolored light displayed on the vessel. The red light is usually visible from a quarter to a half mile further off than the green, and the white much further off.

A series of magnetic observations, which are to extend over a space of 14 months, have recently been commenced at Goettingen, Germany. They will take place under the supervision of the Professor of the University, on the 1st and 15th of every month, at the same hours as those performed by the international expeditions sent out to the North and South Poles. Their principal object is to ascertain the magnetic condition of the earth. Experiments will also be made with respect to magnetic intensity in the garden of the observatory, in a pavilion built up of wood and brick only, iron being omitted on account of the disturbing influences which it would exert, rendering the observations practically valueless.

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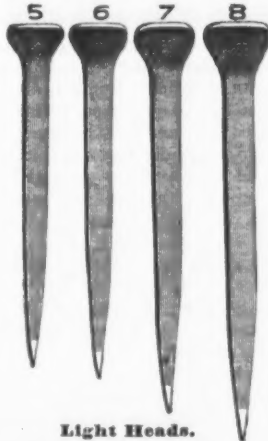
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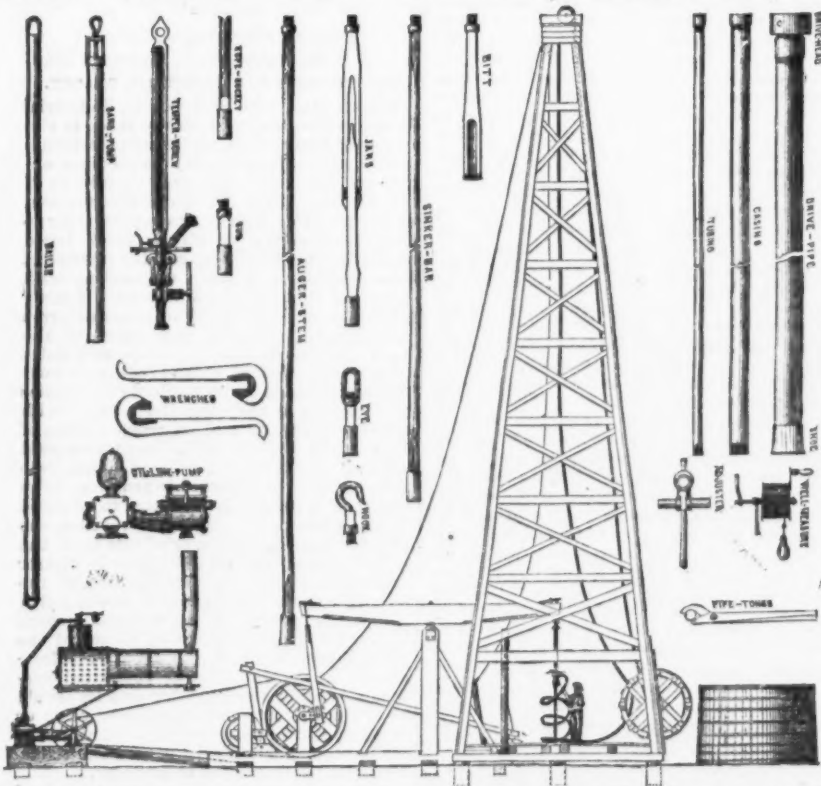
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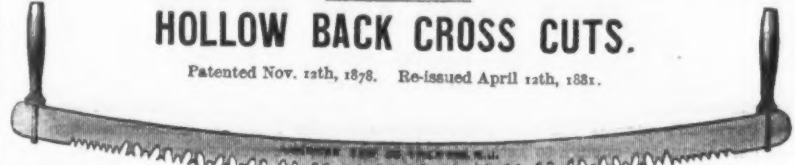
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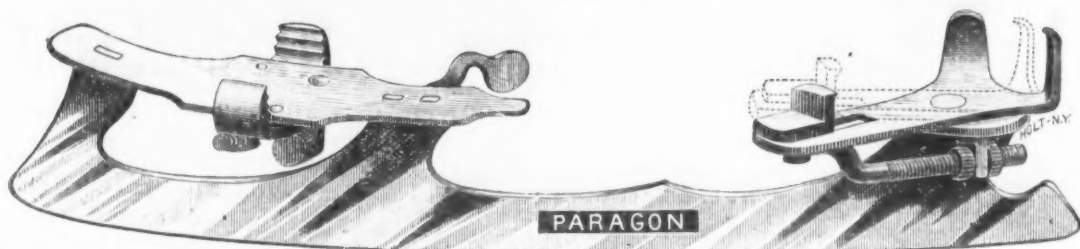
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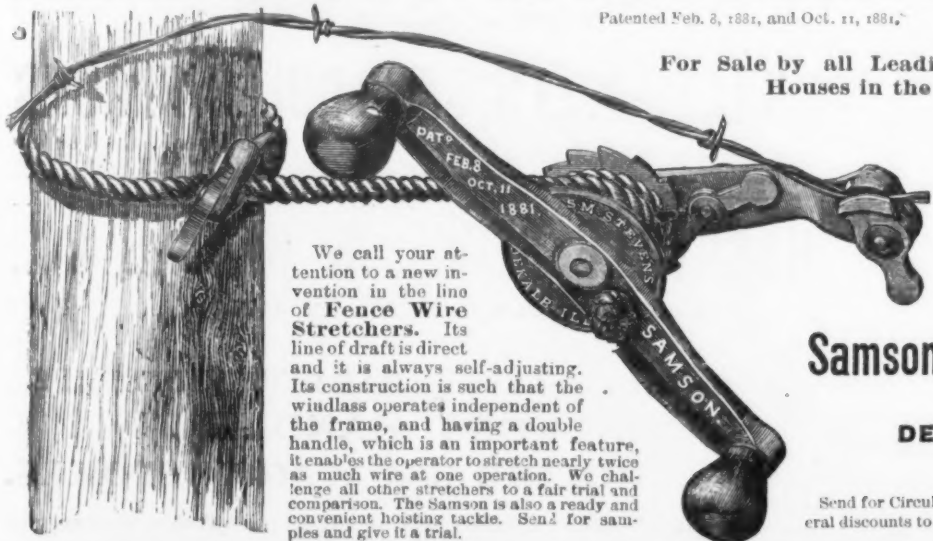
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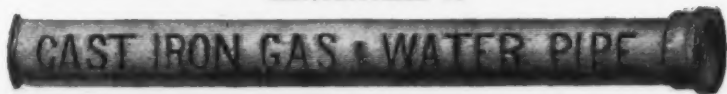
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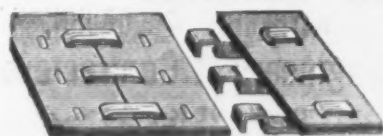
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Commercial Enterprise in Europe.

A pretty story, well told, is given below. It first appeared in *Galignani*:

As an illustration of American enterprise and energy in Europe, we call the attention of our readers to what has been accomplished by an American at Bellegarde and Perte du Rhone. About an hour by rail from Geneva the Rhone, after having mingled its blue water with the gray waters of the Arve, enters a narrow, deep gorge. From the railway, which follows the river, you can hear the waters groan and roar in the bed they have made for themselves. Suddenly the stream disappears to reappear some hundreds of yards further on—hence the name, Perte du Rhone (Loss of the Rhone). The village where the return occurs is called Bellegarde, a place of indifferent aspect, but promising to become an industrial center, and probably a large city. Strangely enough, the transformation will be as much the outgrowth of American ingenuity as the result of that freakish turn of the river Rhone. An American tourist visited the Perte du Rhone. He, perhaps, Yankee-like, shrugged his shoulders at first, as he thought of and compared the scene before him with his own glorious Niagara, but, when his quick wit ripened into practical ideas, he began to solve a mighty problem. Thoughtfully he walked back to Bellegarde, and, going straight to the notary, said to him:

"Sir, your locality pleases me. Is any of the land for sale? I am possessed with the idea of building a sort of laundry establishment on these beautiful shores. Find me one or more choice spots and I will purchase. Do you understand?"

"Perfectly," replied the notary.

And the American departed, promising to return in a week's time.

Sure enough, a week later the Yankee entered the notary's office again, and asked whether his application had brought favorable replies.

"Yes," said the notary, smilingly, and laying his hand on a large pile of letters.

"You have only to make your selection of sites, for here is all the land of the vicinity placed at your disposal, almost at your own price, for the people about here are only too glad to sell, and, as you see, have eagerly grasped this, the first and only opportunity they have had to do so. I tell you frankly these facts that you may feel tempted to make a larger purchase than I imagined you thought of doing when you first spoke of the matter to me." The American listened quietly, looked over the papers, learned the various prices, and ended by contracting to buy all the land offered for sale. The notary, as well the inhabitants, was almost stupefied with astonishment. Some went so far as to say the stranger was mad, but when they found that his word and his bond were equally good, they were too glad of the results to question the motive. Thus an American became the proprietor of almost the whole plain of Bellegarde. Soon he began to show these unlightened people why he had appeared "so mad" to them. He demonstrated that between that point where the Rhone disappears and where it returns again there is a considerable difference of level, and that just there was an enormous loss of water-power—a power which it was possible to gather up and utilize, and, in order to accomplish this, he proposed to open a new channel for the Rhone, and conduct it to the place where he wished to transform its fall into motive power. The idea was practicable, and was put into execution without much delay. A company has been formed, a subterranean channel of more than 500 yards in length has been dug, and a part of those waters which had been engulfed without profit to anybody, now follow peacefully their new road, to pour themselves into enormous turbines, and communicate to them a power valued at that of 10,000 horse-power. Ten thousand horses, however, at the bottom of a hole would, even with all their strength, be useless power without the ingenuity of man. And the question now was, how to transport said power to the summit of the steep banks of the plain of Bellegarde. This was accomplished by means of iron wire cables, which transmitted movement and force to great pulleys, around which they were rolled. Power can thus be sent several miles as easily as water or gas is sent through a pipe or conduit, and the "Yankee from America" carried out his plans through this means. Now the lands are to be resold, the 10,000 horse-power will be rented, the American will realize a fortune, and Bellegarde will become the asylum of the exiled workmen of Alsace, and the place where they will invest their little capital. So much for one American abroad!

which have been written in non-copying ink, this paper answers a very satisfactory purpose by being dampened somewhat more thoroughly and pressed a little longer than would otherwise be required. The thin copying paper mentioned above is warranted by the agents to give four bright, clear copies from copying inks, and two copies from most of the writing fluids.

The Use of Gas.

C. William Siemens, in his address to the British Association, gives some interesting figures in regard to the use of gas. A pound of the ordinary quality used in England he estimates to produce 22,000 British thermal units. This, he says, he considers equivalent to double the number obtainable from a pound of ordinary English coal. In an ordinary gas flame, Dr. Tyndall finds that only 1-25th part of the radiant energy is luminous, and the hot products of combustion carry off about four times as much energy as is radiated. In other words, not more than 1-100th part of the heat involved in combustion is converted into light. Of course, if the waste of heat could be utilized in heating the air and the gas on its way to the flame, a very great increase in the temperature of the flame itself would be possible. In fact, it might be raised to a temperature of 2300° C., or say 4400° F. At such a temperature the proportions of luminous rays to the total heat of combustion would be more than double, with a corresponding increase in the brilliancy of the light. It is hoped that the burners to produce such an increase will be introduced. In winding up his remarks in regard to the uses of gas and its future as a source of power, he comes to the conclusion that if a temperature of about 2732° F. and a pressure of four atmospheres can be obtained in an explosive gas engine, a theoretical efficiency of about one-half can be obtained, while with a good expansive engine the theoretical efficiency would be about two-sevenths. Deducting the losses by friction and radiation in both kinds of engine, he finds that the best steam engine will yield in mechanical effect about one-seventh part of the heat energy, while with equal deductions of the gas engine he thinks that one-fourth can be easily obtained. As a prediction he says that "before many years we shall find, both in factories and on board ships, engines with a fuel consumption not to exceed one pound of coal per effective horse-power per hour, and with these engines the gas producer will take the place of the steam boiler."

We congratulate the world that there is one boiler explosion on record about which there is no mystery. We know all about it. There is no chance for a low-water jury to sit upon it and propound conundrums to scientific humbugs in the witness box. The whole thing was planned beforehand, although none of those concerned seemed to understand what the plan was likely to result in. One of a battery of boilers was being cleaned. It had a leaky stop-valve. Its safety-valve sat directly on the top of its connection with the main steam pipe. To make everything comfortable for the workmen inside, the only outlet from the boiler was closed by a special stop-valve, said stop consisting of a pine plug driven from the inside of the boiler into the steam pipe on the top of the dome. The repairs being finished, the workman came out, closed up the manholes, filled the boiler with water and started a fire under it. It was a very patient boiler, undoubtedly, for it stood this treatment for four hours and then "let go." Even the letting go was done in a rational and dignified manner, decently and in order. The top of the dome cracked off partly through the rivet-holes and partly in the solid metal. Only one man was killed and \$15,000 worth of damage done, which, all things considered, was rather a moderate price to pay for such an extremely interesting explosion. Very fortunately the plug stayed in the hole where it had been driven, although its projecting end was very badly broomed out by the expansion of the steam in the pores; hence there was no doubt about the cause. We are under the impression that this is the only boiler explosion on record about which there is no "mystery," no "unequal expansion," no "low water," no "electricity," no "explosive gas," no anything except the breaking of the metal when the pressure became too great.

Brains, machinery and a great amount of good timber makes the United States one of the leading manufacturing countries of the world. Just how much the total value of its manufacture is we do not know, but it is certain that during the year which ended June 30, 1881, somewhat more than \$3,000,000 worth of furniture was sent out of the country. During the same year the total exports of the country amounted in round number to \$834,000,000. Of this Great Britain and her colonies absorbed 60 per cent. One of the English papers, in figuring up the growth of the country, says that the exports of last year were \$60,000,000 larger than the year previous, all of which is immensely encouraging, and we suppose it would be in order to indulge in a moderate amount of spread-eagle oratory on the subject. This, however, had better be postponed until our showing of exports reaches an approximation to those of Great Britain or France. It must be remembered that while we were sending a large quantity of manufactured furniture out of the country, we imported at the same time more than \$1,300,000 worth.

A new company for the manufacture on an extensive scale of asphalt wrought-iron pipe will be organized in this city between now and January 1. Parties interested in the Asphalt Wrought Iron Company, of Kansas City, Mo., will be interested in this new company. Newton B. Childs, secretary and manager of the Asphalt Wrought Iron Pipe Company, will be secretary and manager. G. W. Pearson, engineer of the above-named company, will occupy the position of hydraulic engineer, and Messrs. Richmond, Dean and Edward G., of Batavia, N. Y., will also be interested. The capital stock will be fully \$250,000. In a later issue we will state the location of the new works.—Chicago Industrial World.

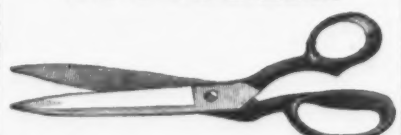
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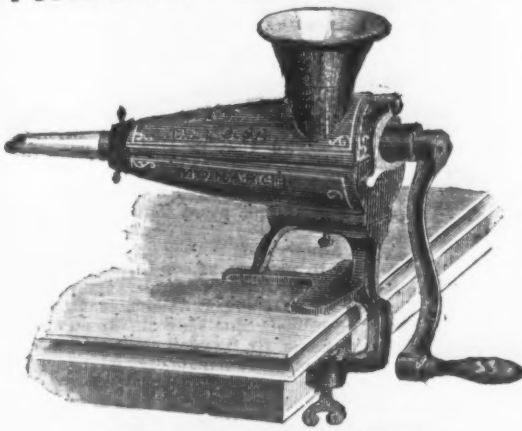
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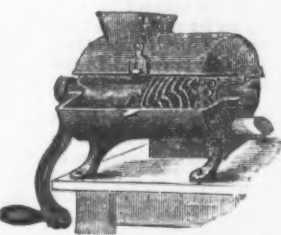
Improved Copying Paper.

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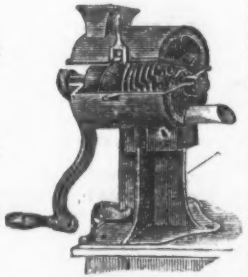
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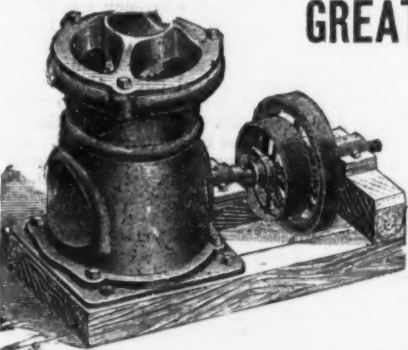


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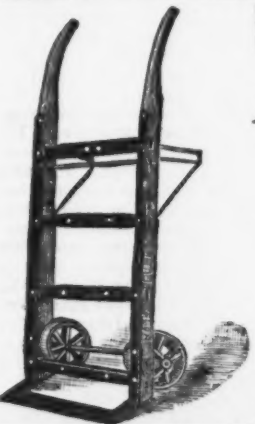
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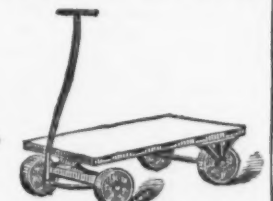
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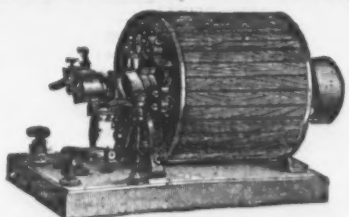
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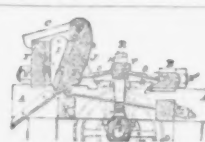


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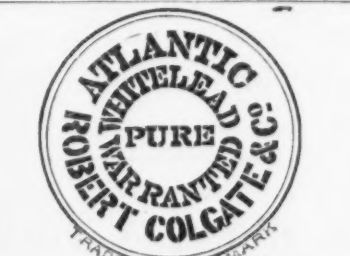


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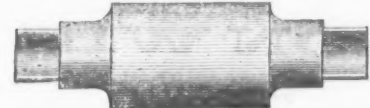
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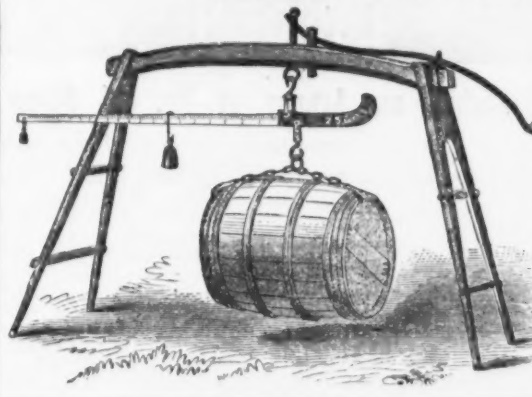
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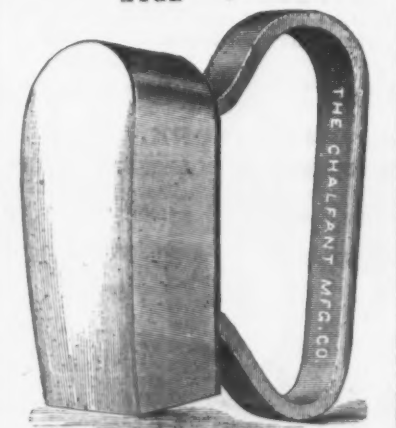
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The Barbed Fence Wire Suits.

The following is the decision of Judge Gardner, of the Superior Court of Illinois, in the case of the Chicago Galvanized Fence Wire Co. vs. the Washburn & Moen Mfg. Co.:

The bill in this case is in the nature of a bill for specific performance of a contract.

Prior to January 1, 1881, the Washburn & Moen Mfg. Co., having acquired the control of various patents for the making and use of barb fence wire, brought various suits in the United States Circuit Court for the Northern District of Illinois, against alleged infringers of their patents, and, the cases having been heard, on that day a finding was announced by the court in favor of the company, sustaining their patents. This final decree was actually entered on April 25, 1881, in the case *versus* Jacob Haish, which, for the purpose of hearing, was treated as the principal case, upon which the others should turn, and was followed by corresponding decrees in the other cases.

The result of the announcement of the finding of the court was that, soon after, all the defendants in those suits, except Haish, and also other alleged infringers, settled with the Washburn & Moen Mfg. Co., and in all cases where that company desired to do so (except one admitted by inadvertence), it acquired from the parties control of the patents held by them not already controlled by the company, which the company considered of any real value, and the various parties took licenses from the company, admitting the validity of the patents held by the company, and agreeing to pay royalty on future production.

The settlements included an adjustment of the back damages claimed by the company, as well as a license for future manufacture, and the evidence shows the same general policy in all the cases, the essential being an adjustment of the damages on a basis somewhat different in the various cases, according to the estimated value to the company of the patents to be acquired by the company from the parties settling, the acquisition by the company of such patents as they desired to control, and the license to the parties settling for future manufacture. No concert existing among the defendants in the matter of these arrangements, but the company's agents conducted the settlement arranged with each defendant separately, stating, however, to each the general policy of the company, the general limits made under which the settlements for back damages would be made, and the royalty at which future production would be licensed.

While the evidence shows that the general limits governing the adjustment for back damages were stated by the company's agents not to be very broad, yet it also shows that as to that matter each party made the best settlement he could, and, as far as appears, there was a considerable diversity in the manner and terms of the various settlements, and it does not appear that any party, in that regard, was influenced greatly in making his settlement by what had been done, or was proposed to be done, with any other party.

As to the future production, however, all the evidence on that point shows that an inflexible rule was stated by the agents of the company, and so far as appears, no essential variation from that rule was made in favor of any license, unless in the case of Jacob Haish.

The essence of complainant's bill is that there was a variation from that rule in Haish's case, and hence the appeal to this court.

One of the provisions of the license issued by the Washburn & Moen Mfg. Co. to the complainant is that "the royalty to be paid under this license shall not be greater than that to any other party licensed after 1st of January, 1881, under the said several letters patent" named in the license, and if said company shall license other parties to manufacture under said patents or any of them, at a less sum per pound than three-fourths of a cent, then and hereafter the royalty to be paid by the said complainant to said company, under this license, "shall be the same as such reduced royalty." A similar provision, so far as appears, was contained in all the licenses issued by the Washburn & Moen Mfg. Co. (being some 40 in number) to parties litigant and others, consequent upon the decree of the United States Court.

No settlement was arrived at with Jacob Haish until about six months after the other parties had settled and taken licenses. He had, however, applied for license on January 1, 1881, but no arrangement being reached, he had taken steps looking to a review of the finding and decree of the court against him. Various negotiations between him and his attorneys, and the Washburn & Moen Mfg. Co. and its agents, finally resulted in an arrangement which was consummated on July 26, 1881.

Prior to this arrangement the situation between the company and Haish was substantially the following:

Haish was the owner of certain patents, mainly for inventions of his own, for styles of barbed wire and manner of manufacturing the same, which had been held by the United States Court to be subordinate to and infringements upon patents held by the company, but, instead of acquiescing in the decree of the court, he was actively contesting it.

He was the owner, of an interest at least, in an invention of one Stevens of a machine for barbing wire, which, however, was in controversy, and which the company claimed was subordinate to a patent controlled by it. Under the order of the United States Court, Haish, as a condition of the continuance by him of the manufacture of barbed wire, while the case against him was pending, had paid into court the sum of \$25,000, to cover damages, if he should be found liable as an infringer.

In addition to that amount, if ultimately beaten in the litigation, he was liable to the company for damages to a large amount, possibly as high as \$75,000.

The company had settled with everybody but Haish.

The arrangement between the company and Haish, appearing upon the face of the papers in evidence, was the following:

1. A license from the company to Haish,

under various patents controlled by the company, in terms substantially identical with those to other licensees, authorizing the manufacture of 10,000 tons of barbed wire yearly at $\frac{3}{4}$ of a cent per pound.

2. An acceptance by Haish and consent by Ellwood, identical with those given by other licensees.

3. An assignment by Haish of the various patents issued to or held by him pertaining to the business of manufacturing barbed wire.

4. An exclusive license to Haish for the making, using, and selling of barbed fence-wire under the various patents issued to him.

5. A license to Haish for the use of the Stevens machine.

6. A release from the Washburn & Moen Manufacturing Company and Ellwood to Haish of all claim for damages for infringement of fence-wire patents owned or controlled by them or either of them.

7. A release by Haish to the company and Ellwood of all similar claims.

8. An agreement between the Washburn & Moen Manufacturing Company and Haish reciting the purchase from and conveyance by Haish of his patents.

His transfer and release of claims for damages, and his acceptance of a license from the company, and their providing in substance:

That the company, by itself or licensees, will manufacture 8000 tons of barbed wire every year until February 27, 1894, and pay to Haish, his executors or administrators, until that time, 75 cents per 100 pounds upon the wire so manufactured, not exceeding 4000 tons each year, and a further sum of 25 cents per 100 pounds on any excess over that amount each year, up to 4000 tons, but not exceeding that.

That the company shall not, however, pay any part of such sum to Haish, unless he shall have first paid or tendered the company, as royalty under his license from the company, a sum equal to the amount he shall demand from the company.

Contemporaneously with the settlement, the Washburn & Moen Mfg. Co. obtained from Joseph F. Glidden and the Thorn Wire Hedge Company, who were interested in the recovery by the Washburn & Moen Mfg. Co. from Haish of damages for infringements of certain patents, releases of their claims to any part of such damages, and prior to or about the time of the settlement, the company also got from all its licensees, but three or four, a request to purchase from Haish his patents and claims and arrange for the payment for the same out of the royalties to accrue from Haish under his license. The complainant upon application had refused to sign such a request, and the settlement was made without it. In addition to what appears in the papers, it also appears that upon their execution and delivery the Washburn & Moen Mfg. Co. paid Haish, in cash, \$10,000, agreed that he might withdraw from the court the \$25,000 paid in by him, and that a decree for nominal damages should be entered in the case against Haish, without costs to either party.

A suit pending in the same court in which the Washburn & Moen Mfg. Co. and Ellwood were complainants, and Haish defendant, was also disposed of in the same manner.

From evidence which the court regards as competent, it appears that the negotiations with Haish consumed considerable time; that the idea of the purchase from Haish of his patents was suggested at a very late day; that, when the substance of the settlement had been agreed upon, the form which it should take was a matter of much discussion and concern; that very able and astute counsel were specially employed to prepare the papers, and that the result, as now shown, was regarded as very much more desirable than the usual manner of putting the entire agreement into a single instrument.

After the execution and delivery of the papers and the receipt, and the withdrawal by Haish of the moneys from the Washburn & Moen Mfg. Co. and the court, the situation of the parties was this:

The Washburn & Moen Mfg. Co. was the owner of the Haish patents, but had given an exclusive license for their use, without royalty, during their life.

The Washburn & Moen Mfg. Co. owned the Stevens machine claim, for the use of which they also gave Haish a license without royalty, and in addition paid him \$10,000 cash.

Mutual releases as to damages for past infringements had been executed, the result of which was to release \$25,000 deposited by Haish in court, and to relieve him from a probable claim for \$75,000 more.

Haish could make 4000 tons of wire yearly free of royalty, and 4000 more at a royalty of $\frac{3}{4}$ cent per pound, and if he did make the 8000 tons, would pay an average of \$10 a ton less royalty on the whole than any of his licensed competitors.

As a matter of fact, his manufacture has not exceeded 4000 tons yearly up to the time of the hearing.

The litigation between the parties had been ended by a nominal decree against Haish.

It is obvious that the only gain in the matter to the Washburn & Moen Mfg. Co. was the removal of Haish from the field of litigants of its right to control the business of manufacturing barbed fence-wire in this country.

The gain to the licensees of the company was, so far as appears, a relief from the possible danger of a prosecution by Haish for infringement of his patents, which so far had been held subordinate to the patents under which they were licensed, and against which the Washburn & Moen Manufacturing Company was not bound to protect them.

The loss to the licensees was, perhaps, not appreciable in dollars and cents, but in the feeling, that while they were paying three-fourths of a cent per pound on their manufacture, a competitor was in the field, licensed like themselves, who could make and sell 8000 tons of wire annually, at the same price as themselves, but at a profit of \$10 a ton more than they could realize.

After the settlement with Haish, the complainant endeavored to learn its terms. Inquiries addressed to the counsel of the Washburn & Moen Mfg. Co. and to Haish resulted in no information, but a letter to the company brought a letter as follows:

"We beg to state that Mr. Haish has taken on a license under our patents, present or future, precisely the same as any other licensee we have. Further, Mr. Haish took precisely such a license as was given your company and under precisely the same terms."

While this reply was true literally, yet it concealed the fact of the agreement back, and, to say the least, was disingenuous, and calculated, if not intended, to deceive.

In addition, the evidence disclosed that, for a time at least, it was understood that the terms of the settlement with Haish should be kept secret. Connect with these circumstances the consent, or request, procured by the Washburn & Moen Mfg. Co. from most of its licensees, and the anxiety as to the form of the settlement, and we have convincing proof that the company and its advisers had very clearly in mind the fear at least that something was being done which it might be troublesome to explain should it be questioned.

My conclusion is that the chief object of the settlement was the termination of the litigation with him; that the purchase of his patents and the Stephens claim was a secondary matter, and was used to give the appearance of a consideration, to what was in reality a license free of royalty for the manufacture of 4000 tons, yearly, of barbed wire, and of 4000 more tons at a less rate by 25 cents per 100 pounds than to the other licensees, and so a reduction to Haish to that extent, of which the complainants have a right to avail themselves under their license.

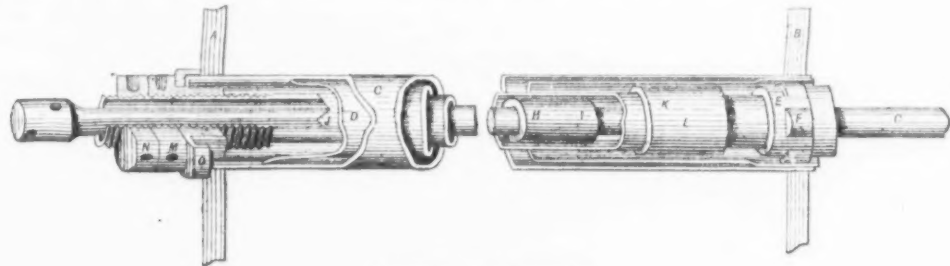
In so far as the complainants seek to secure any benefit on account of the damages for infringement agreed to be paid by them, I am not inclined to grant them any relief, having some doubt as to the propriety of such relief under the bill, and regarding the settlement with Haish in that regard as not a violation of an agreement or understanding with the complainant.

The views of the court as to the right to relief in this form have not changed since the disposition of the demurrer to the bill.

The objection of non-joinder of Ellwood as defendant the court holds untenable. Ellwood was not a party to the agreement which is the basis of this action, except as to consenting to it for purposes only affecting himself and the Washburn & Moen Mfg. Co., not in any way affecting the contract between that company and the complainant. Decree accordingly.

Morgan's Tube Expander.

Messrs. William Reid & Co., London, England, are now introducing a very handy appliance for stopping and expanding leaky boiler tubes. An examination of the engraving of the apparatus, which we furnish this



Morgan's Tube Expander.

week, will be found to convey a very good idea of its construction and working. The appliance is shown ready for use in the boiler tube C, which is fixed in the tube plates A and B, A being the smoke-box plate, and B the combustion chamber or back-end plate. The inner tube or stopper is designated by D, while the expander E carries the rollers F, G being a mandrel for turning the expander. The latter is provided with a connecting-rod and socket, by means of which the end of the tube in the combustion chamber can be expanded from the smoke-box end, as will be readily seen by inspecting the cut. J is an adjusting roller, by means of which the expanding rollers are properly centered, while their position longitudinally is regulated by the nut M. I and L are securing pins; N is a check nut, and O a cap. Should any of the tubes become leaky at the back end, it is unnecessary to send men into the combustion chamber in order to remedy the evil, and a delay in making the necessary repairs is thus obviated. The tubes are made a driving fit at the smoke-box end, and the leak is immediately stopped on inserting the inner tube, and there is thus no chance of accident from scaling. The apparatus is, as will be seen, a very simple appliance, and engineers will undoubtedly justly appreciate its merits.

The annual meeting of the American Society of Mechanical Engineers will take place on the first Thursday in November (the 2d). The programme for the meeting is not yet published, but, we understand, will contain some interesting features. Our readers will remember that the joint or memorial session of the societies takes place on the first of the month. Particulars of this will be found in a note below. The local committee of the society which has been appointed has full charge of the details of preparation, and is already at work. Those who are able in any way to assist in making the meeting profitable, are invited by the president to confer with this committee. Members residing in or near New York are especially urged to cooperate, as far as possible, in every way that may be practicable. One feature of the session is worth special attention. It is the debate upon the papers which have been presented during 1882. These are all in the hands of members, and ought to be carefully considered with a view of taking part in the debate and adding any facts which may be of value to those already recorded.

The St. Louis Bridge and Tunnel Company are taking a step in the right direction. They are about putting an interlocking switch system in use in their freight and passenger yards, but instead of making the switchman in the signal tower do the work of operating the switch, this will be per-

formed by hydraulic power. It seems to us that a greater mistake is rarely made than that of attempting to control and work a large number of switches (many at great distances) from a central tower simply by human exertion. The man who has to carry in mind a considerable number of complicated motions, and look out for a great number of trains, ought to have no manual labor to perform. The switches ought to be manipulated as easily as the key-board of a piano. Steam is cheap, and when the operator needs all his brains to attend to the more important part of the work, it is better to let steam do the manual labor while the man furnishes the brain power.

LABOR AND WAGES.

Mention has been made of the action of the delegates of the Fourth Amalgamated District, at the convention held in Chicago, in demanding the expulsion of Mechanics' Lodge, No. 28, of Pittsburgh, from the order. The latter have, as is known, issued a circular demanding the resignation of President Jarrett. The following are the resolutions of the Chicago Convention in full:

Whereas, A circular emanating from Mechanics' Lodge, No. 28, Amalgamated Association of Iron and Steel Workers of Pennsylvania, and setting forth that John Jarrett, President of the Amalgamated Association, has been unfaithful to the trust reposed in him, and derelict in the performance of the duties required of him, and attributing to the position taken and maintained by him during the late strike of the ironworkers connected with this association the whole cause of their defeat; and,

Whereas, We, the delegates of the steel mills of the Fourth district, in convention assembled, regard said circular as foreign to the true spirit of unionism, and calculated to prevent the free expression of honestly formed convictions by our National Lodge officers, and in direct conflict with the spirit and letter of our laws; be it, therefore,

Resolved, That we call upon all lodges loyal to this organization to join with us in denouncing this cowardly and unjustifiable attack upon the integrity of our President, and we accord to him our hearty and earnest encouragement and support until his term of office has expired, or until he has violated his obligations as a member of this association and been tried and removed from office by those competent to act in such emergencies; and, be it further

Resolved, That the publicity given to said circular in the face of President Jarrett's reelection by an overwhelming majority at our last National Convention brands it as a malicious attempt of personal enemies and soreheads to bring his good name into disrepute; and, be it further

Resolved, That this convention regards the course pursued by the Mechanics' Lodge No.

settled and never will be until we receive pay for all saleable coal, and to do this it is necessary that a law be enacted by the General Assembly to prohibit the use of screens any larger than is necessary to separate the refuse matter from the coal. And steps



Adjustable Socket Wrench.

should be taken by this convention toward securing this necessary legislation as soon as possible. No efforts should be spared.

JOHN McBRIDE, President.

JOHN H. WILLIAMS, Secretary.

The coal miners of the pits near Pittsburgh are called to meet Friday, October 27, at Pittsburgh, to consider the advisability of "demanding back" the 4 cents in the railroad mines, and to consider and take action upon the following resolutions: 1. That the railroad miners demand back the one-half cent per bushel recently lost. 2. That such demand take effect on the 15th of next November. The 15th of November is suggested

28, of Pennsylvania, as sufficient cause for the trial and expulsion of said lodge from this organization, and that we hereby call upon our National Lodge officers to proceed against them with speed and vigor, and that our National Secretary be requested to forward a copy of these resolutions to all lodges connected with this association and a copy of the same be furnished the press for publication.

It is stated that about 1000 glass-blowers from Belgium, Germany and the north of France are on their way to New Jersey, and would be put to work in the idle factories.

Mr. D. R. Jones, president of the West Pennsylvania Miners' Association, has resigned, and issued a valedictory address.

The Cincinnati mills are all at work again, and a committee of manufacturers and workmen are now in Pittsburgh to get the data for learning what Pittsburgh prices are.

The smelting works of the Lone Elm Company, Joplin, Ill., have been closed down in consequence of some dissatisfaction among the smelters, owing to an order issued by the president of the company requiring the full per cent. to be made on the minerals melted, and on failure to do so, a reduction of two cents per pound would be made in the smelters' wages. The order was afterward changed to read one per cent., but even this failed to satisfy the smelters.

Helmacher's Mill, at St. Louis, Mo., is still running non-union.

To the miners of the different mines in the State of Ohio: You are hereby notified that a State convention will be held in the city of Columbus, Ohio, on Wednesday, the 25th day of October, 1882, at 10 o'clock, a. m. Each mine shall be entitled to one delegate; but where one mine is unable to send a representative, two or more may combine for that purpose, and the basis of representation shall be one vote for every 50 miners or the fractional part thereof. The following is respectfully submitted for consideration, and will be acted upon in said convention: 1. The adoption of a scale of prices to regulate the price of mining throughout the entire State, and based upon the price of coal by the flat in the Cleveland and Toledo markets, or upon peddled iron. 2. Failing in the above, that a series of organized suspensions be inaugurated throughout the entire State at stated intervals, thus preventing the accumulation of large quantities of coal upon the docks and in coal-yard accumulations, which compel us either to accept or resist periodical reductions. 3. To perfect the State and mine organizations so that we may more easily obtain information pertaining to our interests. 4. The screen question is not

in order to give the sections impoverished and weakened by the recent lock-out time to somewhat recover their old strength. Besides giving them generally another pay, it will throw their demand into the cold weather, when the demand for coal is great, and the abilities of the employees to advance wages are expected. If, however, the constituencies believe the date too distant, they will instruct their delegate to have it changed at the convention. To save the expenses of another convention soon thereafter to elect officers for the ensuing term, the coming convention may, if the constituencies so wish, elect them, or this business can be postponed.

Adjustable Socket Wrench.

Our engraving represents a socket wrench now being introduced by Bowker & Tripp, of New Bedford, Mass. The manufacturers assert that this wrench has no equal for putting up shafting or other overhead work where a wrench is required. It is also well adapted for holding on to the bolt head while the nut is being removed. Besides the usefulness of this wrench for purposes connected with the machine shop, it is also well adapted for removing nuts from carriage axles, or in places where it is an advantage to grasp a nut or bolt head securely. As may be seen by the engraving, which clearly illustrates the construction of the wrench, it is adapted to nuts or bolt heads of various sizes. When used in connection with carriage-work, it will grasp and hold any size of nut in the socket-jaws when it is removed from the axle of the carriage, and thereby preserve it clean from dirt and grit. The wrench is adjusted as to size, by simply revolving the handle. It is positive in its action, and seems well designed to meet the requirements for which it has been designed.

Keely is not discouraged; quite the contrary. The company have the utmost confidence in him, and he is working night and day at his patent. Everything is being done post-haste, in order to have the invention completed by December 10, the time agreed upon. The board of directors of his company consists of 13 men, which probably accounts for the unfortunate character of the enterprise. This number is to be reduced to 7, and the by-laws changed accordingly. We rise to make a suggestion, which is that Keely be put under bonds not to invent anything, or have anything to do with his machinery, that the company pay him a salary of \$10,000 a year, invest funds in an annuity for the purpose, and then go out of existence. This would be altogether the cheapest method of operation for the company,

and would save them a vast deal of trouble, as well as the public a great amount of mental wear and tear.

Jamin attributes scintillation to the continually changing curvature of the surfaces of luminous waves. He has lately made an extended series of observations with Arago's scintillometer, which confirms the theory of Cooke, Newton and Young, while they discredit that of Arago, who attributed the phenomenon to the interference of waves.

Special Notices.

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IN STORE, AUG. 31.

One Screw Planer, 70 in. x 11 ft.
One Engine Lathe, 24 in. x 14 ft. New.
One Engine Lathe, 24 in. x 14 ft. New.
One Engine Lathe, 16 in. x 6 ft. Blaisdell.
One Engine Lathe, 16 in. x 6 ft. Wood & Light.
One Engine Lathe, 14 in. x 5 ft.
Two Lathes, 14 in. x 4 ft. Hand.
One Lathe, 12 in. x 3 ft.
One Bench Lathe, 11 in. x 3 ft. 6 in.
Two Pratt & Whitney Gear Cutters.
One Pratt & Whitney Monitor Lathe.
One Profile Machine.
One Wood & Light Milling Machine, No. 4.
One large Index Milling Machine.
One Ames, 4 Spindle Drill.
One Daniels Planing Machine.
One Crank Planer.
One Burleigh Rock Drill, No. 4. New.
One Woodward Pump, No. 4. New.
One Woodward Pump, No. 3. New.
One Knowles Pump, Special, No. 7.
One No. 4 Knowles Pump, New.
One Corliss Beam Condensing Engine, 30 in. x 72 in.
One Oscillating Engine, 12 in. x 10 in.
One Horizontal Engine, 12 in. x 24 in.
One Horizontal Engine, 9 in. x 16 in.
One Horizontal Engine, 14 in. x 24 in.
Two Horizontal Engines, 6 in. x 8 in.
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One Portable Engine, 8 in. x 12 in.
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Shafting, Hangers and Pulleys.
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A Civil and Mining Engineer of long experience. Undoubted references as to ability and integrity required. Address
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Shear to cut 14 inch by 3/4 inch.
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WANTED—Position with rolling mill, either iron or steel or nail factory. Has had large experience in the sale of iron, steel and nails; is thoroughly acquainted with dealers in and large consumers of merchant iron, steel, nails, boiler plates and sheet iron. Many years connected with large manufacturers of iron, steel and nails; at present connected in a responsible and official capacity with a mill whose product has an excellent and extended reputation. Would accept position in charge of correspondence and sales, in office, or would accept management of branch house or agency in western or eastern city, or would travel. Successful persons for desiring to change. Address
IRON AND STEEL,
Office of The Iron Age, 83 Reade St., New York.

Wanted.

A thorough, capable Foundryman who fully understands and is competent to take entire charge of manufacturing department of Malleable Iron Works in Chicago.
Address, stating salary and references,
MALLEABLE IRON,
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Wanted.

A second hand Corrugating Machine. State number of corrugations, time of use, and details. Also, an experienced man to superintend manufacture corrugated metals. Highest references required.
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Table Cutlery, Carvers, &c.

E. BISSELL & CO.,
WHOLESALE AUCTIONEERS,

Will make a

Large and Peremptory Sale of Table Cutlery, Carvers, Plated Ware, &c.,
ON THURSDAY AND FRIDAY, NOV. 2d & 3d,

At 10 o'clock A. M.,

At 83 Chambers and 65 Reade Sts., N. Y.,

comprising in part over 12,000 dozen Table Knives and Forks, desirable patterns in Cocoa, Bone, Ebony, Ivory, Rubber, Celluloid, &c. Also for THANKSGIVING AND HOLIDAY TRADE, 2500 pair Carvers, in Bone, Ebony, Cocoa, Ivory, Stag and Rubber.
500 pair and sets elegant carved handle Walrus Carvers.
10 doz. richly carved Pearl Handle Dessert and Table Knives, plated blades.
500 doz. Plated Knives, 12 oz. plate.
1000 doz. Plated Tea and Table Spoons and Forks, 4, 8 and 12 oz. plate on 18 per cent nickel silver.
150 cases fine Plated Knives and Forks, 12 oz. plate.
1000 sets Plated Moths, 3 and 4 ps. sets.

Pocket Knives, Shears, &c., &c.
The sale will be worthy the attention of the trade.

CIRCULAR No. 2.

We beg to announce to the Trade that our sale of Table Cutlery, Carvers, &c., will continue

TWO DAYS,
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in place of one day, as heretofore advertised. We will include in this sale about 500 doz. Butcher, Sticking and Skinning Knives, first quality.

100 doz. Ivory Handle Table and Dessert Knives.
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100 pair Ivory Carvers.
Also, Table Knives and Forks, Carvers, Steels, Plated Tea and Table Spoons and Forks, &c., &c. All above first quality goods.

Also,

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We would call especial attention to this sale as being worthy the attention of the trade.

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A business firm, well established in the West, desires to act as agents for manufacturers of Brass and Iron Goods, Machinists' and Plumbers' Supplies, Tools, Metals, Crucibles, Steam Packing, &c., &c. Will buy good patents or manufacture on royalty.
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Heavy work preferred.
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Two Engine Lathes, 42 in. x 15 ft. Triple Geared. Ames, New August.
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One Engine Lathe, 28 in. x 15 ft. Ames, New.
One Engine Lathe, 28 in. x 15 ft. Ames, New.
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Two Engine Lathes, each 24 in. x 15 ft. Fitchburg, New, Ames.
Two Engine Lathes, 24 in. x 10 & 12 ft. Fitchburg, New.
Three Engine Lathes, 20 in. x 12 ft. Ames, New.
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Two Schlenker Bolt Cutters, 3/4 to 1 1/2, with dies.
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No. 2 Cabinet Turret Lathe, 18 in. by 6 ft.
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30 in. x 36 in. x 9 foot Planer (2d hand; good order). Wheeler.
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|--------------------------------------|-------------|
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| 15 in. Shaper. | 450 |
| 5 in. Shaper. | 115 |
| Milling Machine. | 215 |
| 45 in. radial Drill. | 750 |
| No. 17 spindle Drill Nut Tapper. | 300 |
| No. 12 in. 16 in. Nut Tapper. | 300 |

In addition we have on hand a large assortment of new and second hand Machine Tools, Engines, Boilers and Pumps, Wood-working and General Machinery, fully described in our catalogue, 25, 26 and 27, which we mail free on application.

S. C. FORSAITH & CO.,

Machinists and General Machine Dealers,
Manchester, N. H., and 207 & 209 Centre St.,
NEW YORK CITY.

For Sale.

Palo Alto Rolling Mills, Near Pottsville, Pa.,

ON THE MAIN LINE OF THE POTTSVILLE
AND READING RAILROAD.

These mills are in good repair, and can be started in two days' time.
Rolls for T-rolls 15 to 25 lbs. per yard, and for Street Mills 15 to 25 lbs. per yard.
Guide Mill Train for Merchant Iron 1/4 to 1 inch.
Rolls for Merchant Bar, round and square, up to 4 1/2 inches.
Number of Puddling Furnaces in both mills, 30; Heating Furnaces, 3; all with boilers attached.
Also Foundry, Machine Shop, Blacksmith Shop, Iron House, Roll House, Carpenter and Pattern Shop, Stables, handsome Dwelling for Superintendent, 11 Tenement Houses, a Rick Office, and ample grounds for stock and fodder.
For further particulars address:

Messrs. LEE & McCAMANT, Extrs.,
Pottsville, Pa.
THOS. F. WRIGHT, 184 Kace St., Philadelphia, Pa.
HUGH W. ADAMS, 56 Blue St., New York.

For Sale or Lease.

A Large Two-Story Brick Factory,
formerly Machine Works, at Pearl River, N. Y., on railroad depot, 25 miles from New York City. Railroad facilities unfavourable on the line of the New York and New York Railroad. The property contains 4,000 square feet floor space, with one 8 ft. Engine and Boiler, 750 ft. 2-inch line shafting and pulleys, main belt, steam heating and water pipes throughout the building. A splendid iron top, 70 ft. by 60 ft., with one iron smelting cupola with Mackade Blower, brass furnace, core oven, blacksmith shop, pattern vault, annealing oven, etc. The property can be bought or leased on liberal terms. For further particulars, price, terms, etc., address
J. E. B. & CO.,
113 Liberty St., New York City.
Or Pearl River, Rockland Co., N. Y.

For Sale.

4 Noiseless Vertical Engines, 8 x 8 Cylinder, New.
11 H. P. Vertical Tubular Boiler, cast-iron base plate; all complete; in good order. Second Hand.
F. B. BANNAN,
STEAM HEATING AND BRASS WORKING,
Pottsville, Schuylkill Co., Pa.

FOR SALE.

One Horizontal Engine, 10 hp. x 48 in.
One Horizontal Engine, 24 hp. x 60 in.
One Horizontal Engine, 21 hp. x 36 in.
One "Corlis" Horizontal Engine, 18 in. x 48 in.
Two Horizontal Engines, 30 in. x 60 in.
Two Horizontal Engines, 30 in. x 36 in.
Two Link-motion Engines, 18 in. x 20 in.
One Upright Engine, 20 in. x 30 in.
Housings, Pumps and Bed Plate suitable for 18 in. train.
JOHN CARROLL,
264 and 266 Water Street.

Corliss Engines For Sale.

PROMPT DELIVERY.

One 12-inch cylinder, 36-inch stroke, at once.
One 12-inch cylinder, 36-inch stroke, in two weeks.
Apply to

THE GEORGE PLACE MACHINERY CO.,
121 Chambers and 103 Reade St., New York.

For Sale.

Second hand
DROPS and LIFTERS.
BEECHER & PECK,
Lock Box 122, New Haven, Conn.

For Sale.

Horizontal Engines, 16 x 42 (Hewes & Phillips), with cut-off; 16 x 36 (Carrier), with cut-off; 16 x 28 Upright Engine, with cut-off; one 50 H. P. Locomotive Boiler; one 4-ton "Olds" Freight Elevator; one 50 H. P. Portable Tubular Boiler. All the above guaranteed complete and in perfect order.
For particulars address:
BEECHER & BARNALL,
40 Cortlandt St., N. Y.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,
Is no license to use the Process for the
Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens Martin, Puddling, Blast and Cupola Furnaces. The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of The Iron Age of Oct. 15th, 1882.

MANUFACTURERS OF HARWARE OR
House Furnishing Goods wishing to be represented to the Jobbing Trade of New York, Address
MANUFACTURERS' AGENT,
Office of The Iron Age, 82 Reade St., New York.

Trade Report.

BRITISH IRON AND METAL MARKETS.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Oct. 25, 1882.

Scotch Pig.—The market is quiet, with a moderate business doing, and prices are steady. We quote as follows, makers' prices:

| | |
|-------------------------------|------|
| Langloan, alongside, Glasgow. | 68/ |
| Coltness " " | 69/ |
| Gartsherrie " " | 65/6 |
| Summerlee " " | 65/ |
| Carbroke " " | 59/ |
| Glenarnock " " | 58/6 |
| Edginton " " | 53/ |

Lighterage from Ardrossan to Glasgow is 2/6 1/2 per ton.

Cleveland Pig.—Transactions during the week have been large, with quiet market.

We quote as follows, nominally:

| | |
|-----------------------------|------|
| Middlesboro' No. 1 Foundry. | 48/6 |
| " No. 2 " | 47/ |
| " No. 3 " | 45/ |
| " No. 4 Forge " | 43/6 |

Bessemer Pig.—There is a marked improvement in the demand and transactions have been large. Prices tend upward. W. C. Hematites, mixtures Nos. 1, 2 and 3, equal portions, are quoted 56/ @ 57/6, f. o. b. shipping ports.

Blooms.—Continue in moderate demand and prices are steady. We quote: Bessemer, 7' x 7' £4. 17/6 @ £5, f. o. b. shipping ports.

Manufactured Iron.—The market is quiet, with fair demand. We quote at works, nominally:

| Staff. Ord. Marked Bars. | £ | s. | d. | £ | s. | d. |
|--------------------------|---|----|----|---|----|----|
| " Medium " | 7 | 10 | 0 | 8 | 0 | 0 |
| " Common " | 7 | 5 | 0 | 7 | 15 | 0 |
| " Common " | 5 | 10 | 0 | 7 | 15 | 0 |

Hopps, 20 W. G. and over.
" Ordinary Best. 5 12 0 @ 9 0 c
" Medium. 7 10 0 @ 7 15 0
" Common. 7 10 0 @ 7 10 0

Sheets, 20 W. G. and under.
" Ordinary Best. 10 0 0 @ 11 10 0
" Common. 9 0 0 @ 10 30 0
Welsh Bars. 6 0 0 @ 6 10 0

Steel Rails.—There is a better demand and prices have been stiffened. Transactions for the week have been fair. Ordinary Sections are quoted £5 @ £5. 10/ f. o. b. shipping ports.

Iron Rails.—Nominal. Welsh, £4. 17/6 @ £5.

Old Rails.—Moderate offerings and small sales. Old Tees are quoted £3. 17/6 @ £4, and Old D. H's, £4 @ £4. 2/6, c. i. f. New York.

Scrap.—Business is light, with offerings moderate. Heavy Wrought is quoted, nominally, £3. 12 6 @ £3. 15/ c. i. f. New York. Bessemer Scrap Ends, run of the mill, are quoted 65/ @ 67/6.

Copper.—Business has been light during the week and prices are easier. Best Selected is quoted £76 @ £77, and Chili Bars, £70. 10/ @ £71.

Tin.—The market is dull, with declining demand, and prices tend in buyer's favor. Straits Tin, spot, is quoted £102 @ £102. 10/, and futures, £103 @ £103. 10/.

Tin Plates.—The market is quiet, with a moderate business doing. We quote, nominally:

| | |
|--|------------|
| Tin Plates, 10 x 14, 1st qual. Charcoal. | 22/ @ 24/ |
| " " " 2d " " | 20/ @ 21/ |
| " " " 3d " " | 18/ @ 19/6 |
| " " " 4d " " | 16/ @ 17/ |

Spelter.—The market is quiet and prices easier. Ordinary is quoted, at shipping port, £16. 17/6 @ £17.

Lead.—Prices are steady, with quiet market. English Common Pig is quoted £14 @ £14. 5/.

Freights.—Steam from Glasgow to New York, 11/; ditto from Liverpool to New York, 12/; Liverpool to Philadelphia, 13/.

FINANCIAL.

Office of THE IRON AGE,
WEDNESDAY EVENING, October 25, 1882.

There is little change to report since our last weekly review, either in the monetary situation or in the generally quiet tone of trade, and this is true of the local market as of the country at large. Money is in ample supply for all legitimate purposes at moderate rates of interest, but trade fails to realize the sanguine expectations formed earlier in the season, though it is admitted to be of fair proportions. The Clearing House exchanges show an increase in the aggregate movement of business compared with the previous week and with the corresponding week last year, the gain being most perceptible in New York. The export trade, too, shows some improvement, the total for the week having been exceeded only twice this year, due in part to a free outward movement of cotton and hops. The exports of flour and wheat were also quite liberal. The chief source of dissatisfaction is found in the restricted shipments of grain and provisions from the West. The official statement of the railway shipments from Chicago of flour, grain and provisions for the week ending Saturday, October 21, shows a decrease from the preceding week of this year of 3128 tons, and a decline of 23,034 tons, or 50% from the shipments of the same week of 1881. As remarked on the Produce Exchange, "It is all very well to say that money is easy and crops large, but the shipments east from Chicago and some other important Western points seem to decrease, and that state of things will have to change before any improvement in the market can hold."

The improvement looked for finds little encouragement, either in the declining prices at home or advances from abroad, as farmers will hold with a firmer grip, and it is conceded that considerable changes must take place before the foreign markets become free. At the same time in speculative circles, certain heavy operators here and in the West, who are in a position to control the market for produce and grain, are closely watched with a mingled feeling of distrust. In dry goods there is only a quiet demand.

Commissioner Fink has given notice, on behalf of the respective trunk lines, that the rates on West-bound freight to Chicago will on and after November 1st be advanced, in accordance with an agreement come to by the lines interested. The advance will be on the basis of 75 cents for first-class freight, 60 cents for second, 45 cents for third and 35 cents for fourth class. The rates are said by railroad people to be reasonable, and it was thought they would be acceptable to the forwarders and others.

Money has continued easy throughout the week at from 4 to 6% on stocks and 3 to 4% on Government bonds. We quote 60 to 90 days indorsed paper 6 @ 6 1/2%; four months' acceptances, 6 1/2 @ 7, and good single names, four to six months, at 6 1/2 @ 7 1/2.

The posted rates for bankers' sight sterling, after having advanced twice during the week, were on Tuesday reduced to \$4.82 for 60 day and \$4.86 1/2 for sight. The market is weak for sterling and strong for Continental. Cotton and grain bills are expected soon in larger volume.

Transatlantic freights are extremely dull, and the market is weak, except for cotton, for which there is a continued good demand for tonnage to load South.

On the Stock Exchange during the week the market has been irregular and generally heavy, trading being almost wholly in the hands of professional operators. Comparing sales at the opening and at the close, the improvement or decline, as the case may be, is only fractional with most of the stocks in the list, but in the leading specialties the changes equal 1 @ 2%, except Lackawanna and Western, which advanced 2 1/2%; Illinois Central advanced 3 1/2%; Chicago and St. Louis advanced 3 1/2%. Wabash preferred declined 4%, and Wabash Pacific 2 1/2%. At first the Vanderbilts lost strength, advancing sharply, while the Gould stocks were only steady. The Denver, Wabashes and Pacific stocks were sharply attacked. On Saturday and Monday the whole list fell off, but rallied in the later sales, and on Tuesday, after some lively skirmishing, the market became buoyant. To-day stocks develop no special feature, the market being irregular and closing at a fractional advance. The leading stocks to-day have ranged as follows: Denver, 52 1/2 @ 50 1/2, D. L. and W., 138 1/2 @ 130 1/2, Canada Southern, 67 1/2 @ 69, Lake Shore, 112 1/2 @ 113 1/2, Michigan Central, 102 1/2 @ 103 1/2, Erie, 41 1/2 @ 42 1/2, Western Union Telegraph, 87 1/2 @ 88 1/2, Wabash, 31 1/2 @ 32 1/2, Wabash preferred, 57 1/2 @ 58 1/2, Union Pacific, 107 @ 106 1/2, Texas Pacific, 41 1/2 @ 42 1/2, Milwaukee and St. Paul, 109 1/2 @ 110 1/2, St. Paul and Omaha, 48 1/2 @ 49, do. preferred, 107 1/2 @ 108, Jersey Central, 72 1/2 @ 73 1/2, New York, Chicago and St. Louis, 15 1/2 @ 16 1/2, do. preferred, 30 1/2 @ 33 1/2, Missouri Pacific, 105 1/2 @ 106 1/2, Louisville and Nashville, 55 1/2 @ 56 1/2, Kansas and Texas, 35 1/2 @ 36 1/2, Northern Pacific preferred, 92 1/2 @ 93 1/2 and Oregon and Trans-Continental, 86 1/2 @ 87.

At the United States Sub-Treasury, Mr. Acton, the Assistant Treasurer, has devoted the last 17 days to the work of signing the new gold certificates, of which about \$13,000,000 have been applied for and issued. Silver certificates are no longer issued on deposit of gold, since the order of the Department of October 4, the issue being restricted to actual deposits of silver.

Government bonds were firm throughout, and the closing quotations were as follows:

| | Bid. | Asked. |
|-------------------------------------|---------|---------|
| U. S. 6's, '81, continued at 1 1/2. | 10 1/2 | 10 3/4 |
| U. S. 5's, '81, continued at 3 1/2. | 113 1/2 | 114 1/2 |
| U. S. 4's, '1201 registered. | 113 1/2 | 114 1/2 |
| U. S. 4's, '1201 coupon. | 113 1/2 | 114 1/2 |
| U. S. 4's, '1201 Registered. | 113 1/2 | 114 1/2 |
| U. S. 4's, '1201 COUPON. | 113 1/2 | 114 1/2 |
| U. S. 3 per cents. | 109 1/2 | 110 1/2 |
| U. S. Currency 68 1895. | 110 1/2 | 111 1/2 |
| U. S. Currency 68 1896. | 110 1/2 | 111 1/2 |
| U. S. Currency 68 1897. | 110 1/2 | 111 1/2 |
| U. S. Currency 68 1898. | 110 1/2 | 111 1/2 |
| U. S. Currency 68 1899. | 110 1/2 | 111 1/2 |

State bonds have generally been dull but steady. To-day Tennessee 6's, new, advanced 1/2 to 47 1/2; Missouri 6's of 1886 sold at 108, and Tennessee 6's, old, at 48. The importations of specie and bullion at this port during the week ending October 20 were \$141,371, consisting of \$127,798 in gold, and \$13,573 in silver, as against a total of \$2,535,873 for the week ending Oct. 22 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

| | Since January 1— | 1882. | 1881. |
|---------|------------------|--------------|-----------|
| Gold. | \$1,800,618 | \$48,966,827 | 2,268,826 |
| Silver. | 2,129,798 | 2,268,826 | 2,268,826 |
| Total. | \$3,930,416 | \$51,235,653 | 4,537,652 |
| | Since August 1— | 1882. | 1881. |
| Gold. | \$1,158,127 | \$30,132,788 | 567,868 |
| Silver. | 667,090 | 567,868 | 567,868 |
| Total. | \$1,825,217 | \$30,700,656 | 1,135,736 |

The bank return for the week was again a very favorable exhibit, showing a gain of \$933,350 in reserve, which now stands at \$2,788,750 above, against \$1,907,275 below at this time last year, and \$3,565,450 above for the corresponding date in 1880.

The following is an analysis of the bank totals of this week compared with that of last week:

| | Oct. 14. | Oct. 21. | Comparisons. |
|-------------------|---------------|---------------|------------------|
| Loans. | \$311,000,400 | \$310,208,200 | Dec. 1, 1901, 20 |
| Specie. | 50,206,500 | 53,715,100 | Inc. 1,508,600 |
| Legal Tenders. | 21,347,700 | 20,347,700 | Dec. 1, 1901, 20 |
| For. Reserves. | 73,548,200 | 74,052,800 | Inc. 504,600 |
| Deposits. | 280,771,200 | 287,090,200 | Dec. 1, 1901, 20 |
| Reserve required. | 71,603,800 | 71,271,050 | Dec. 1, 1901, 20 |
| Surplus. | 1,815,400 | 2,788,750 | Inc. 973,350 |
| Accumulation. | 18,745,700 | 18,763,100 | Inc. 17,400 |

MINING STOCKS.

The closing quotations for Mining Stocks were as follows:

| | Bid. | Asked. |
|----------------------------|--------|--------|
| Ame. | 11 | 11 |
| Alta Mont. | 2 1/2 | 2 3/4 |
| Bodie | 10 | 10 |
| Bonanza Chief | 3 | 3 |
| Big Pittsburgh | 30 | 30 |
| B. H. & E. N. | 11 1/2 | 11 1/2 |
| Calaveras | 4 | 4 |
| Cale B. H. | 1 3/4 | 1 3/4 |
| California | 27 | 30 |
| Chimney | 4 | 6 |
| Consolidated Imperial | 4 | 4 |
| Consolidated Virginia | 71 | 71 |
| Chrysolite | 1 50 | 1 60 |
| Cent. Ariz. | 56 | 56 |
| Cherokee | 10 | 10 |
| Decatur | 69 | 61 |
| F. D. Smet | 4 00 | 4 00 |
| Gr. Prize | 30 | 55 |
| Great Eastern | 2 | 4 |
| Green Mountain | 50 | 50 |
| Gold Strike | 30 | 30 |
| Horn Silver | 8 1/2 | 8 1/2 |
| Independence | 1 00 | 2 85 |
| Independence | 91 | 1 05 |
| Iron Silver | 2 1/2 | 2 1/2 |
| Lacrosse | 14 | 25 |
| Leadville Con. | 60 | 65 |
| Little Pitt. | 1 15 | 1 15 |
| L. Chief | 50 | 50 |
| Mexican | 3 65 | 3 90 |
| Moose | 5 | 7 |
| N. Belle | 11 | 11 |
| N. Belle Isle | 15 | 27 |
| Orl. and Mil. | 11 | 11 |
| Robinson Con. | 1 65 | 1 70 |
| R. Sun | 5 | 7 |
| S. Nevada | 5 | 5 1/2 |
| Standard | 5 | 5 1/2 |
| S. Cliff | 88 | 91 |
| Sutro | 28 | 30 |
| St. Hite, new | 30 | 35 |
| South Pacific | 13 | 15 |
| St. L. and A. | 4 | 5 |
| St. L. and A. | 12 | 13 |
| Tuscarora | 7 | 9 |
| Union Con. | 4 35 | 5 00 |
| Vizina | 1 30 | 1 45 |

GENERAL HARDWARE.

Business in General Hardware has increased considerably during the week, and both manufacturers and jobbers seem satisfied with its volume. Values are remarkably steady, and no changes of any importance have been announced since we last went to press. In foreign hardware a fair amount of business is transpiring, and prices are firm and unchanged.

The demand for Nails has tapered off considerably, still there is a fair amount of business doing. The tone of the market continues strong, and quotations are unchanged, viz.: rod. @ 60d. \$3.65, net, in carload lots and upward, with a slight advance on smaller orders.

We have received the following circulars:
Office of DAVID MAYDOLE & CO.,
NORWICH, N. Y., October 20, 1882.

It is our sad duty to announce to our customers and the trade generally the death of David Maydole, the founder of the works and the senior partner of the firm. Mr. Maydole died on Saturday morning, October 14, after a lingering and painful illness. Mr. Maydole provided for the uninterrupted continuance of the interest of his estate in the firm and business of David Maydole & Co. by the undersigned.
CHARLES H. MERRITT,
CYRUS B. MARTIN,
Surviving partners of David Maydole & Co.

BINGHAMTON, N. Y., Oct. 25th, 1882.
DEAR SIR: We beg to advise you that we have this day formed a co-partnership, under the firm name of "Binghamton Hardware Company," for the transaction of a general hardware business, in addition to what we shall carry a full line of Railroad, Machinists' and Contractors' Supplies. Messrs. Motley & Stirling, of 86 John street, New York, will act as our buyers in that city, which will enable us to take advantage of the lowest market prices, and increase our facilities for doing business in many ways. We earnestly solicit the liberal patronage extended the late firm under this name, believing that we can now give our customers lower prices and better satisfaction than ever before. We will continue at the old stand, as above, and are now ready to fill orders promptly. Trusting to hear from you at an early date, we remain,
Yours respectfully,
W. H. STERLING, New York.
T. N. MOTLEY,
Geo. E. MAY, Binghamton.

NEW YORK, October 16, 1882.
DEAR SIR: The unsettled and unsatisfactory condition of the Wire Cloth Weaving business throughout the country, and its constantly growing importance, has influenced the undersigned to issue this call for a convention of the entire Wire Cloth Weaving interest of the United States and Canada, for the purpose of establishing a uniform price list, regulating sales and placing our industry upon a firm and more enduring

Tenues, \$5.25 @ \$5.50; Coke Tin, \$5.20 @ \$5.35, and ditto Ternues, \$5 @ \$5.12. Liverpool has also been easing off a little the past few days. It came yesterday: Coke Tin, 16 @ 16 1/4, and Charcoal, 19 @ 20. London cables to us: "Market quiet, with moderate business doing."

Lead.—This metal has lost all the stability and strength which temporarily had been imparted to it artificially, and as the production is this year something astonishing, it follows that a great tumble is apprehended by holders. Some expect Lead soon to touch 4 1/2¢ and below this; to-day it is nominally still worth 4 3/4¢, without anything doing, and refined hardly more, after a sale thereof of 50 tons at 5¢ since we last reported. What the trade would be happy to know is the amount, more or less, still in the hands of the chief holder, unsold. Some insist that the quantity is 2000 tons, and others 3000 tons. Much of the immediate fate of prices in New York depends on this item, for if the party alluded to still holds much of its speculative purchases, strength will, of course, be lent to the market for some time longer, artificially, from the same quarter. If, on the other hand, it be but a comparative trifle, there may be every readiness to assist in precipitating a decline, even to a level under 4 1/4¢. From bona fide trade demand we do not expect much support, unless the winter should prove as mild as it was last year. In other words, the immediate future is very uncertain; the safest will be, probably, under the circumstances, to buy from hand to month. St. Louis is, of course, weaker too, say 4 3/4¢ for Hard and \$4.70 for Soft, nominally, with 38¢ freight. From Europe we receive per cable the ensuing message, direct, this afternoon: "Prices are steady, with quiet market. English Common Pig, £14 @ £14.5." There is no change in manufactures. We quote: Pipe, 7 1/2¢; Sheet, 8¢; Tin-lined Pipe, 15¢; and Block, 45¢, all less 10¢ to the trade. We find in our Peninsular exchanges a Spanish Government decree ordering that henceforward San Lucar de Guadiana, in the province of Huelva, be the outlet for the export of Lead ore, litharge, &c.

Spelter and Zinc.—Common Spelter fares no better than the remainder of metals, for Domestic is down to 5 1/4¢ @ 5 1/2¢, and Silesian to 5 1/4¢. The famous syndicate in Europe seems to be as much of a fizzle as any of its predecessors. We quote: Bortha Refined, 8¢, and Bergenport, 9 1/2¢, while Sheet Zinc is also lower, say 6 1/4¢ @ 6 1/2¢, without much demand at present, at least none from either the refrigerator or stove-board people. Per cable from London we are informed to the following effect: "Market quiet and prices easier. Ordinary at shipping port, £16, 17/6 @ £17."

Antimony.—There is a steady, fair jobbing demand at unaltered figures, say 13¢ @ 13 1/2¢ for Co-keon, and 11¢ for Hallett. No change in London.

COAL

There is a cheerful feeling among the Anthracite Coal dealers and operators, who speak of a good fair trade in progress, with a demand for the domestic sizes. Trade is as good as it was a year ago, and perhaps a little better. There are no new features. The prices obtained are up to the September rates, but do not approximate to those of the October circulars, and nothing is said about a further advance. Some difficulty is spoken of in filling orders promptly at the shipping ports.

Lehigh is quoted \$5.25 for Lump and \$4.50 @ \$4.75 for other sizes; Reading Company's \$4.15 @ \$4.50 for Broken and \$4.70 @ \$4.90 for Stove, Egg and Chestnut. Lackawanna, \$1.15 @ \$1.40, according to size.

Bituminous Coal is in good demand, but deliveries in New York are embarrassed by lack of transportation. Cumberland is quoted \$3.50 at Baltimore, with freight charges to New York of \$1.40. Clearfield is about \$5 alongside in New York.

The total Anthracite product for last week was 669,018 tons, against 636,342 tons for the same week of last year, and the product for the year so far is 22,201,340 tons, or as compared with the corresponding period of last year, an increase of 701,784 tons. The Schuylkill region's proportion was 168,784 tons.

Freights to Boston are \$1.15; to Providence, 90¢. The current rates from Port Richmond by water are: \$1.40 @ 1.50 per ton to Boston; \$1.25 to Fall River and Providence; 85¢ to New York.

FOREIGN TRADE MOVEMENTS.

The following is a summary of foreign trade movements during the past week:

Imports.

For the week ended October 20:

Total, \$3,330,665; 1881, \$3,188,767; Prev. reported, \$3,118,650; 347,580,033; 40,704,741.

Since Jan. 1, \$198,458,321; 1881, \$137,800,555; \$112,483,508.

Included in the imports were leading articles of merchandise valued as follows:

| Quantity | Value |
|--------------------------|---------|
| Antimony, 34 | \$2100 |
| Arms, 202 | 2,532 |
| Brass goods, 48 | 6,222 |
| Bismuth, 4 | 1,850 |
| Bronzes, 69 | 18,453 |
| Chains and anchors, 31 | 1,178 |
| Clocks, 93 | 12,608 |
| Copper, 15,818 | 15,818 |
| Cutlery, 233 | 91,564 |
| Gas fixtures, 1 | 21 |
| Guns, 98 | 15,469 |
| Hardware, 14 | 3,349 |
| Iron, hock, tons, 43 | 1,777 |
| Iron, pig tons, 6,708 | 14,047 |
| Iron, sheet, tons, 271 | 34,846 |
| Iron ore, tons, 3,603 | 9,474 |
| Iron cotton ties, 30,450 | 9,455 |
| Iron, other, tons, 2,793 | 70,831 |
| Railroad bars, 4,264 | 3,209 |
| Lead, pigs, 1,790 | 6,613 |
| Machinery, 476 | 18,024 |
| Metal goods, 490 | 33,347 |
| Nails, 38 | 24,469 |
| Needles, 15 | 5,593 |
| Nickel, 83 | 9,157 |
| Old metal, 1 | 7,146 |
| Plating, 1 | 938 |
| Plated ware, 3 | 9 |
| Perforation caps, 22 | 9,404 |
| Pins, 7 | 385 |
| Plumbago, 164 | 18,142 |
| Quicksilver, 330 | 10,346 |
| Quadrant, 1 | 30,098 |
| Quadrant, 1 | 207,908 |
| Steel, 30,098 | 207,908 |
| Steel blooms, 1,665 | 12,965 |

| | |
|----------------------------------|---------|
| Spelter, lbs., 848,572 | 34,035 |
| Silverware, 6 | 1,110 |
| Steel pens, 9 | 910 |
| Tin, bxs., 44,812 | 228,638 |
| Tin, bbls., 10 | 516 |
| Tin, slabs, 10,107 lbs., 927,540 | 238,033 |
| Wire, 47 | 2,085 |

The following is a comparative statement of the quantities of leading articles imported at different dates:

| For the week | 42 weeks | Same time |
|--------------------------|------------|------------|
| 1882. | 1881. | 1880. |
| Cutlery, pkgs., 233 | 6,147 | 5,697 |
| Hardware, pkgs., 14 | 847 | 704 |
| Iron, R. R. bars, 4,264 | 87,504 | 322,714 |
| Lead, pigs, 1,790 | 28,553 | 28,774 |
| Steel, pkgs., 30,098 | 1,610,312 | 908,788 |
| Tin, boxes, 44,812 | 1,513,601 | 1,110,509 |
| Tin slabs, lbs., 927,540 | 15,777,237 | 13,920,038 |

For the week ended October 21:

| | |
|----------------------------------|-------------|
| Total, \$3,330,665 | \$3,188,767 |
| Previously reported, 347,580,033 | 268,661,335 |

| | |
|--|---------------|
| Total since January 1, 1882, \$198,458,321 | \$137,800,555 |
| Same time in 1881, 40,704,741 | 1,154,704 |
| Same time in 1880, 6,491,884 | 13,064,394 |
| Same time in 1879, 11,045,850 | 11,045,850 |
| Same time in 1878, 41,485,204 | 41,485,204 |
| Same time in 1877, 47,031,774 | 47,031,774 |
| Same time in 1876, 44,004,712 | 44,004,712 |
| Same time in 1875, 43,736,181 | 43,736,181 |
| Same time in 1874, 62,476,997 | 62,476,997 |

For the week ended October 24:

| | |
|----------------------------------|-------------|
| Total, \$3,330,665 | \$3,188,767 |
| Previously reported, 347,580,033 | 268,661,335 |

Since Jan. 1, \$198,458,321; 1881, \$137,800,555; \$112,483,508.

IMPORTS

Merchants' Dispatch Co.

Band iron, bbls., 54

Meissner, Ackerman & Co.

Moore J. B. & Co.

Beams, 8

Joists, 878

Fig. tons, 200

Morton, Elias & Co.

Beams, 85

Bars, 14

Clark Thread Co.

Machinery, cs., 58

Mdse., 34

David Bros., Toolkas & Co.

Cases, 2

Drexel Morgan & Co.

Arms, cs., 15

Dolge A.

Mdse., cs., 2

Durand J.

Cases, 1

Dougan A. & Co.

Cases, 1

Folsom H. & D.

Arms, cs., 24

Mdse., cs., 17

Field Alfred & Co.

Arms, cs., 25

Guns, cs., 25

 Nails, cs., 2 || Wire, cs., 4 | |
| Arms, 215 | |
| Frasco P. A. & Co. | |
| Mdse., cs., 3 | |
| Great Western Disp. Co. | |
| Machinery, cs., 33 | |
| Graef Cutlery Co., 33 | |
| Cutlery, cs., 4 | |
| Havermeyer & Elder | |
| Iron retorts, 12 | |
| Hartley & Grauman | |
| Arms, cs., 9 | |
| Howard Bros. & Co. | |
| Cases, 2 | |
| Isaac & Co. | |
| Dredging machine, 1 | |
| Lancaster J. H. | |
| Machinery, cs., 1 | |
| McCoy & Sanders | |
| Jack, 2 | |
| Levers, bbls., 4 | |
| Merchants' Dispatch Co. | |
| Arms, cs., 48 | |
| Cases, 8 | |
| Moulson J. | |
| Cases, 4 | |
| Morrill L. W. | |
| Guns, pkgs., 1 | |
| Moore's Sons J. P. | |
| Mdse., cs., 14 | |
| Nickar | |
| Machines, cs., 3 | |
| Robinson M. W. | |
| Revolvers, cs., 2 | |
| Squires H. C. | |
| Mdse., cs., 2 | |
| Schoverling, Daly & Co. | |
| Guns, cs., 24 | |
| Mdse., cs., 2 | |
| Scoville Mfg. Co. | |
| Mdse., cs., 7 | |
| Todd Arthur | |
| Machinery, pkgs., 26 | |
| Von Clegg & Co. | |
| Cases, 10 | |
| Ward Asahie | |
| Cutlery, cs., 7 | |
| Case, 1 | |
| Wexel & De Gresse | |
| Broken bayonets, case, 1 | |
| Wiesbusch, Hilger & Co. | |
| Hardware, and cutlery, pkgs., 9 | |
| Witte, John G. & Bro. | |
| Mdse., pkgs., 20 | |
| Order. | |
| Cases, 30 | |
| Cutlery, cs., 2 | |
| Machinery, cs., 1 | |
| Arms, cs., 28 | |
| Guns, cs., 11 | |
| Machinery, cs., 1 | |
| Wire drawing plates, 154 | |

IRON.

Brown Bros. & Co.

Swedish bars, 1054

Budd & Ellis

Engine tires, 4

Bond, Parson & Co.

Fig. tons, 100

Baring Bros. & Co.

Fig. tons, 260

Bundles, 47

Wire rods, coils, 748

Bars, 2182

| | No. 1. | No. 2. | No. 3. |
|---------------|--------|--------|--------|
| Great... | 50/ | 50/ | 50/ |
| West... | 50/ | 50/ | 50/ |
| Lowther... | 50/ | 50/ | 50/ |
| Moss Bay... | 50/ | 50/ | 50/ |
| Distington... | 50/ | 50/ | 50/ |
| Harrington... | 50/ | 50/ | 50/ |
| Salway... | 50/ | 50/ | 50/ |
| Maryport... | 50/ | 50/ | 50/ |

North of England prices, f. o. b. Cumberland ports, &c., are:

| | Ordinary. | Bessemer |
|------------|-----------|----------|
| No. 1... | 53/ | 56/ |
| No. 2... | 53/ | 56/ |
| No. 3... | 53/ | 56/ |
| No. 4... | 53/ | 56/ |
| No. 5... | 53/ | 56/ |
| No. 6... | 53/ | 56/ |
| No. 7... | 53/ | 56/ |
| No. 8... | 53/ | 56/ |
| No. 9... | 53/ | 56/ |
| No. 10... | 53/ | 56/ |
| No. 11... | 53/ | 56/ |
| No. 12... | 53/ | 56/ |
| No. 13... | 53/ | 56/ |
| No. 14... | 53/ | 56/ |
| No. 15... | 53/ | 56/ |
| No. 16... | 53/ | 56/ |
| No. 17... | 53/ | 56/ |
| No. 18... | 53/ | 56/ |
| No. 19... | 53/ | 56/ |
| No. 20... | 53/ | 56/ |
| No. 21... | 53/ | 56/ |
| No. 22... | 53/ | 56/ |
| No. 23... | 53/ | 56/ |
| No. 24... | 53/ | 56/ |
| No. 25... | 53/ | 56/ |
| No. 26... | 53/ | 56/ |
| No. 27... | 53/ | 56/ |
| No. 28... | 53/ | 56/ |
| No. 29... | 53/ | 56/ |
| No. 30... | 53/ | 56/ |
| No. 31... | 53/ | 56/ |
| No. 32... | 53/ | 56/ |
| No. 33... | 53/ | 56/ |
| No. 34... | 53/ | 56/ |
| No. 35... | 53/ | 56/ |
| No. 36... | 53/ | 56/ |
| No. 37... | 53/ | 56/ |
| No. 38... | 53/ | 56/ |
| No. 39... | 53/ | 56/ |
| No. 40... | 53/ | 56/ |
| No. 41... | 53/ | 56/ |
| No. 42... | 53/ | 56/ |
| No. 43... | 53/ | 56/ |
| No. 44... | 53/ | 56/ |
| No. 45... | 53/ | 56/ |
| No. 46... | 53/ | 56/ |
| No. 47... | 53/ | 56/ |
| No. 48... | 53/ | 56/ |
| No. 49... | 53/ | 56/ |
| No. 50... | 53/ | 56/ |
| No. 51... | 53/ | 56/ |
| No. 52... | 53/ | 56/ |
| No. 53... | 53/ | 56/ |
| No. 54... | 53/ | 56/ |
| No. 55... | 53/ | 56/ |
| No. 56... | 53/ | 56/ |
| No. 57... | 53/ | 56/ |
| No. 58... | 53/ | 56/ |
| No. 59... | 53/ | 56/ |
| No. 60... | 53/ | 56/ |
| No. 61... | 53/ | 56/ |
| No. 62... | 53/ | 56/ |
| No. 63... | 53/ | 56/ |
| No. 64... | 53/ | 56/ |
| No. 65... | 53/ | 56/ |
| No. 66... | 53/ | 56/ |
| No. 67... | 53/ | 56/ |
| No. 68... | 53/ | 56/ |
| No. 69... | 53/ | 56/ |
| No. 70... | 53/ | 56/ |
| No. 71... | 53/ | 56/ |
| No. 72... | 53/ | 56/ |
| No. 73... | 53/ | 56/ |
| No. 74... | 53/ | 56/ |
| No. 75... | 53/ | 56/ |
| No. 76... | 53/ | 56/ |
| No. 77... | 53/ | 56/ |
| No. 78... | 53/ | 56/ |
| No. 79... | 53/ | 56/ |
| No. 80... | 53/ | 56/ |
| No. 81... | 53/ | 56/ |
| No. 82... | 53/ | 56/ |
| No. 83... | 53/ | 56/ |
| No. 84... | 53/ | 56/ |
| No. 85... | 53/ | 56/ |
| No. 86... | 53/ | 56/ |
| No. 87... | 53/ | 56/ |
| No. 88... | 53/ | 56/ |
| No. 89... | 53/ | 56/ |
| No. 90... | 53/ | 56/ |
| No. 91... | 53/ | 56/ |
| No. 92... | 53/ | 56/ |
| No. 93... | 53/ | 56/ |
| No. 94... | 53/ | 56/ |
| No. 95... | 53/ | 56/ |
| No. 96... | 53/ | 56/ |
| No. 97... | 53/ | 56/ |
| No. 98... | 53/ | 56/ |
| No. 99... | 53/ | 56/ |
| No. 100... | 53/ | 56/ |

There are 64, of 82 built, furnaces at work on the West Coast, whence last week's shipments included 20, g. o. b., tons pig iron, and 6726 tons rails and blooms.

THE BOARD OF TRADE RETURNS for the month of September, just issued, present many features of interest, although the total exports of the month were only fractionally in excess of those for September, 1881.

It is demonstrated, nevertheless, that our export business keeps up in a marvelous manner, especially in respect of iron, steel, machinery and hardware. The aggregate imports last month were valued at £23,135,908, against £33,191,225 same month, 1881. For the nine months this year's total is £307,496,377, against £266,726,993 last year. The exports last month were worth £20,024,418, as compared with £20,900,653 in September, 1881. The nine months' total is £182,134,944 this year, and £171,819,712 last year. Iron and steel figure for 353,369 tons and £2,575,453 last month, against 376,517 tons and £2,562,268 in September, 1881. For the nine months the totals are 1882, 3,314,513 tons and £23,631,138; and 1881, 3,222,417 tons and £23,102,509. The principal items last month were:

| | Quantities. | Values. |
|---|-------------|-----------|
| | 1881. | 1882. |
| Firearms, small, No. | 20,512 | 18,099 |
| Brass, manufactures of, not being ordnance, cwts. | 8,940 | 1,139 |
| Railway carriages for pass., No. | 5,614 | 18,856 |
| Railway trucks, wagons, &c., No. | 1,154 | 18,990 |
| Coal, &c., tons | 1,095,216 | 1,095,216 |
| Copper, unwrought, cwts. | 18,935 | 132,939 |
| Copper, wrought, cwts. | 44,193 | 126,735 |
| Sheeting, cwts. | 39,974 | 108,886 |
| Iron and steel—pig, tons | 346,572 | 356,600 |
| Bar, angle, &c., tons | 151,542 | 186,081 |
| Railroad, &c., tons | 24,047 | 28,701 |
| Wire except telegraph, tons | 84,610 | 69,007 |
| Wire, telegraph, tons | 6,084 | 7,173 |
| Hoops, sheet, boiler and armor plates, tons | 20,175 | 30,755 |
| Tin plates, tons | 21,115 | 18,559 |
| Cast or wrought, tons | 25,443 | 26,580 |
| Old for remanufacture, tons | 8,751 | 9,280 |
| Steel, unwrought, tons | 18,443 | 17,338 |
| Manufactures of steel and iron, tons | 1,660 | 1,210 |
| Lead, tons | 4,444 | 1,933 |
| Machinery and mill goods, &c., tons | 220,157 | 274,818 |
| Other descriptions, Plate and pipe, and gilt wares, &c. | 531,145 | 711,517 |
| Tin unwrought, cwts. | 21,226 | 30,701 |
| Tin unwrought, cwts. | 5,443 | 1,180 |

THE UNITED STATES the chief lines of interest to your readers are thus selected:

| Articles. | Month of September, 1881. | Month of September, 1882. |
|----------------------------------|---------------------------|---------------------------|
| Alkali, cwts. | 53,707 | 275,913 |
| Hardware and cutlery, &c. | 50,100 | 44,879 |
| Iron—pig, tons | 49,635 | 43,046 |
| Bar, angle, rod, &c., tons | 1,390 | 1,090 |
| Railroad, all, tons | 7,006 | 8,341 |
| Hoops, sheets, plates, &c., tons | 4,670 | 5,522 |
| Tin plates, tons | 15,578 | 16,074 |
| Cast or wrought, tons | 445 | 393 |
| Old, tons | 6,864 | 6,062 |
| Steel, unwrought, tons | 5,312 | 18,539 |
| Lead, all sorts, tons | 61 | 10 |
| Steam engines, &c. | 3,853 | 2,342 |
| Other machinery, &c. | 34,632 | 31,004 |
| Tin, unwrought, cwts. | 4,093 | 64 |
| Special Returns—Iron rails, tons | 313 | 5,929 |
| Steel rails, tons | 6,662 | 20,111 |

THE AVERAGE PRICES PAID were thus compared:

| Articles. | Average price paid per ton in United States only. | Average price paid per ton in United States and foreign. |
|-----------------|---|--|
| Pig iron | £ 8. d. 3 | £ 8. d. 3 |
| Old iron | 3 10 3 | 3 10 3 |
| Unwrought steel | 11 6 11 3 | 11 6 11 3 |
| Iron rails | 7 14 11 3 | 7 14 11 3 |
| Steel rails | 18 6 9 3 | 18 6 9 3 |

FROM THE BRISTOL CHANNEL,

or rather as to the ports therein, I am favored with the following monthly report by Messrs. Edwards & Robertson, of Cardiff:

"The usual monthly returns show a marked decrease during September in the exports of tin plates and railway iron, the latter being 50% less than the previous month, and tin plates 25% decrease. Freight has ruled comparatively low, and in the latter part of the month showed a decided tendency downwards, to be accounted for by a slight improvement of home-made business; 13/12 have been paid for on side boats to New York, the shipments for which will be October loading. A stiff rate has been paid for Montreal, about 23/. The Southern ports have not responded to the low quotations, except to a slight extent. Two steamers have been chartered for rails to New Orleans at 11/1, and this is about the current rate. We quote: New York, 12/6; Baltimore, 17/; Philadelphia, 12/. The following were the exports of iron, &c.: Montreal, 861 tons rails, 10,535 boxes tin plates, 10,705 bars, 493 bundles iron, 412 pigs lead, 3159 bundles fish plates, Providence, 410 tons scrap iron. New York, 60 tons rails, 63,707 boxes tin plates, 77 bundles wire, 773 tons blooms, 90 ingots tin. Baltimore, 3597 boxes tin plates. New Orleans, 2621 tons rails, 180

tons fish plates, 104 tons bolts, &c. Vera Cruz, 650 tons rails, 217 tons bridgework, 50 tons fastenings. San Francisco, 185 tons rails, 304 tons scrap iron."

BIRMINGHAM (October 5, new list.)

| | Per Pound. | To No. 20. |
|----------------|------------|------------|
| Brass wire... | 21 | 21 |
| Copper wire... | 22 | 22 |
| Brass wire... | 23 | 23 |
| Copper wire... | 24 | 24 |
| Brass wire... | 25 | 25 |
| Copper wire... | 26 | 26 |
| Brass wire... | 27 | 27 |
| Copper wire... | 28 | 28 |
| Brass wire... | 29 | 29 |
| Copper wire... | 30 | 30 |
| Brass wire... | 31 | 31 |
| Copper wire... | 32 | 32 |
| Brass wire... | 33 | 33 |
| Copper wire... | 34 | 34 |
| Brass wire... | 35 | 35 |
| Copper wire... | 36 | 36 |
| Brass wire... | 37 | 37 |
| Copper wire... | 38 | 38 |
| Brass wire... | 39 | 39 |
| Copper wire... | 40 | 40 |
| Brass wire... | 41 | 41 |
| Copper wire... | 42 | 42 |
| Brass wire... | 43 | 43 |
| Copper wire... | 44 | 44 |
| Brass wire... | 45 | 45 |
| Copper wire... | 46 | 46 |
| Brass wire... | 47 | 47 |
| Copper wire... | 48 | 48 |
| Brass wire... | 49 | 49 |
| Copper wire... | 50 | 50 |

ROLLED METALS.

Best quality, 1/2 in. wide, to 30 W. G. 7 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 8 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 9 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 10 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 11 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 12 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 13 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 14 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 15 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 16 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 17 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 18 1/2 d.

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Best quality, 1/2 in. wide, to 30 W. G. 23 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 24 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 25 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 26 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 27 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 28 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 29 1/2 d.

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Best quality, 1/2 in. wide, to 30 W. G. 31 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 32 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 33 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 34 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 35 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 36 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 37 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 38 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 39 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 40 1/2 d.

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Best quality, 1/2 in. wide, to 30 W. G. 45 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 46 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 47 1/2 d.

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Best quality, 1/2 in. wide, to 30 W. G. 49 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 50 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 51 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 52 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 53 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 54 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 55 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 56 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 57 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 58 1/2 d.

Best quality, 1/2 in. wide, to 30 W. G. 59 1/2 d.

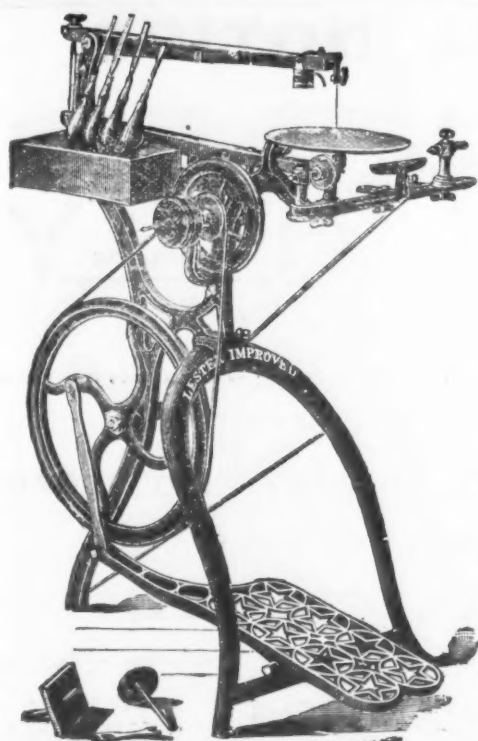
Best quality, 1/2 in. wide, to 30 W. G. 60 1/2 d.

als are steady. We quote Copper, 101 francs 100 kg.; Tin, 270 @ 280; Lead, 35 francs, and Spelter, 42.45 @ 42.50. Coal—We are evidently on the eve of a further advance; Domestic coals at 17 @ 20 francs 100 kg.

HEMERY.

(Borsenhalte.)

HAMBURG, Oct. 10, 1882.—Following is our weekly Dortmund report: "The position of iron and steel in this vicinity has undergone no unfavorable change. Rolling mills have failed to obtain the reduction in puddling pig they made every effort to get; only a few Silesian blast furnaces not belonging to the combination, have lowered the price 1 to 2 marks 100 kg. pig iron. Silesian pig iron is quiet, but makers thereof do not by any means lack orders. Dortmund Foundry Fig. especially the lower numbers, is scarce, hence importation of Cleveland No. 3 has been notably on the increase. Our foundries, besides, frequently complain of the manner in which our blast furnaces sort their kinds of Foundry Fig. hence they are compelled to stick to No. 3, which in this way gets to be easily exhausted. In the various rolling mill branches there is noticeable a fair amount of animation. This relates equally as much to steel works. Only in rails and sleepers more might transpire. Heavy engagements exist in Hoops, Axles and Car Wheels. Throughout our region the car and locomotive shops are doing well. Quite as heavy orders our foundries, machine and boiler can boast of. The bridge builders, on the other hand, still complain. Coal—Westphalian Coal is becoming more and more popular, even abroad, so that the trade therein takes a tremendous stock, even for side steamers. 1000 tons each. Hence great buoyancy and an upward tendency exists, the more so as there will be no scarcity of cars next winter, enough of them having been built to meet the demand, however great it may be. Metals—There is little or no change. We quote Lead, on a quiet market: English Fig. 10 @ 16.50 marks 100 kg.; ditto ditto 10 @ 17.50 marks 100 kg.; ditto ditto 10 @ 18.50 marks 100 kg.; ditto ditto 10 @ 19.50 marks 100 kg.; ditto ditto 10 @ 20.50 marks 100 kg.; ditto ditto 10 @ 21.50 marks 100 kg.; ditto ditto 10 @ 22.50 marks 100 kg.; ditto ditto 10 @ 23.50 marks 100 kg.; ditto ditto 10 @ 24.50 marks 100 kg.; ditto ditto 10 @ 25.50 marks 100 kg.; ditto ditto 10 @ 26.50 marks 100 kg.; ditto ditto 10 @ 27.50 marks 100 kg.; ditto ditto 10 @ 28.50 marks 100 kg.; ditto ditto 10 @ 29.50 marks 100 kg.; ditto ditto 10 @ 30.50 marks 100 kg.; ditto ditto 10 @ 31.50 marks 100 kg.; ditto ditto 10 @ 32.50 marks 100 kg.; ditto ditto 10 @ 33.50 marks 100 kg.; ditto ditto 10 @ 34.50 marks 100 kg.; ditto ditto 10 @ 35.50 marks 100 kg.; ditto ditto 10 @ 36.50 marks 100 kg.; ditto ditto 10 @ 37.50 marks 100 kg



WE ARE STILL
HEADQUARTERS
FOR
LESTER, ROGERS & CRICKET
SAWS, SAW BLADES,
Steel and Wood Bracket Saws
FOR HAND WORK,
BRACKET SETS IN BOXES,
Designs, Wood, and all else in
the Bracket Sawing Line.

These goods are so well known
that nothing is needed to sell them
except to keep them in sight.

Any Hardware dealer may have a
brisk trade around the Holidays by
laying in a stock of these saleable
goods.

Our prices are uniform and steady.
All orders secured before making
quotations will be filled at the lowest
rates. The time is at hand for sell-
ing these goods.

MILLERS FALLS CO., 74 Chambers St., New York.

List Price of Lester Saw, with Lathes, \$10.00 | List Price of Cricket Saw, Foot Power, \$2.00
" " " Rogers Saw No. 1..... 3.50 | " " " Bracket Set No. 2..... 1.25

Amesbury's Band Saw Setting Machine.

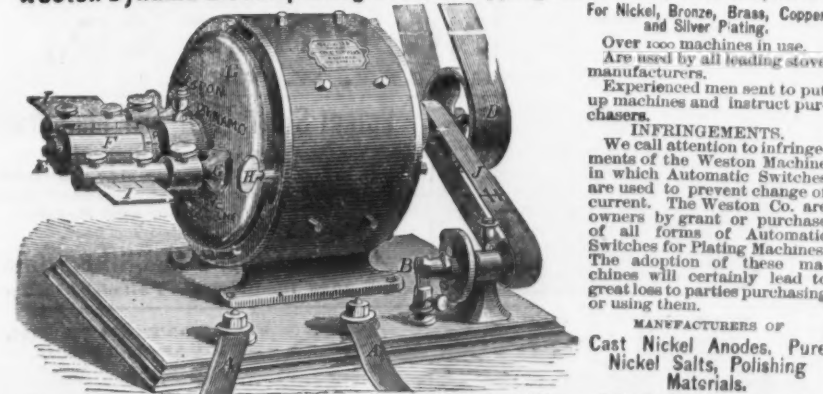
Patented, May 2, 1882.



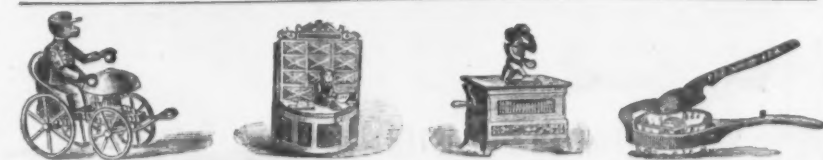
WILL SET SAWS FROM 1/4 INCH TO 2 INCHES WIDE ACCURATELY
AT THE RATE OF
300 Teeth per Minute.
This engraving represents our new Band Saw Setting Machine.
It is designed and constructed upon entirely new principles, and
embodies all the good features of hand-work
in combination with the speed and regular-
ity of machine work. The users of band saws
have long felt the need of a machine that
would hold a narrow saw in a rigid position
and set the teeth without straining the blade;
and in response to inquiries from many of our
leading manufacturers, we have perfected a
machine that will set the teeth on any band
saw without in any manner affecting the
blade. It is arranged to work by an easy,
uniform crank motion, and when the tooth
to be set is fed into position, the blade is
firmly locked between the steel jaws of a
vise, and remains immovable while the tooth
is set to any degree required. As the crank
goes forward, the blade is released, when
the next tooth is fed up to the dies, the
blade again locked in vise, and this tooth set
in the opposite direction. All these move-
ments are automatic, and can be carried on
at a speed of 30 teeth per minute. No
further expense is required outside of the
machine, as the band saw is simply hung up
over the machine on a wooden bracket, and
the lower part left pendant near the floor.
PRICE \$25.
Send for Catalogue and Testimonials.
G. W. AMESBURY & CO.,
3101 and 3103 Chestnut St., Philadelphia, Pa.

CHAMPLAIN
Forged Horse Nails.
MANUFACTURED BY THE
NATIONAL HORSE NAIL CO.,
Vergennes, Vermont.
HOT FORGED AND COLD HAMMERED POINTED, MADE OF BEST
NORWAY IRON AND WARRANTED.
WAREHOUSE
97 CHAMBERS AND 81 READE STREETS, NEW YORK.
DURRIE & McCARTY, Sole Agents.

HANSON & VAN WINKLE, Sole Agents for
Weston Dynamo Electroplating & Electrotyping Machines, Newark, N. J.



Manufactory, Newark, N. J. New York Office, 92 & 94 Liberty St.



Variety Iron Works.
KYSER & REX,

MANUFACTURERS OF
Hardware Specialties, Iron Toys, Novelties
and Housefurnishing Hardware.
Main Office and Factory, Trenton Ave. and Margaretta St., Frankford, Philadelphia.
Branch Office, 11 North 4th St., Phila. Hardware specialties manufactured to order.

CHARLES H. HOWELL & CO.,

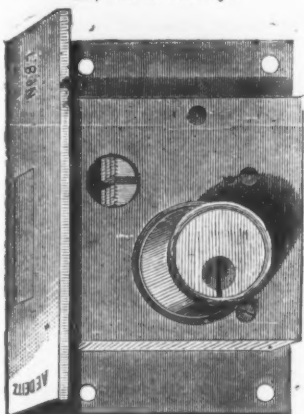
MANUFACTURERS OF

BLACK IRON VARNISHES.

PAINT WORKS, VARNISH WORKS,
212, 214 & 216 Race Street. Kensington, Philadelphia.

A. E. DIETZ,

(Successor to Bates & Deits.)
Manufacturer of
Store Door Locks, Night Latches, Padlocks, Drawer Locks,
&c., with Flat Steel Keys.



Durrie & McCarty, Agents.
97 Chambers & 81 Reade Sts., New York.

THE FORSYTH SCALE CO.,
YOUNGSTOWN, O.,

Manufacture a full line of
FORSYTH'S STANDARD SCALES
Counter, Portable, Dormant,
Stock and Hay, and
R. R. Track
SCALES.

Call Special Attention to their
SUSPENSION HAY & R. R.
TRACK SCALES.

Also, Warehouse Trucks and Letter Presses.

PRINCIPAL WAREHOUSES.

FORSYTH SCALE CO., Chicago;

SIMMONS HARDWARE CO. St. Louis.

PRIZE MEDALLISTS:

Exhibitions of 1862, 1865, 1867, 1872, 1873, and only
award and medal for Noiseless Steel Shutters at
Philadelphia, 1876; Paris, 1878, and Melbourne,
1881.

CLARK, BUNNETT & CO.,
LIMITED.

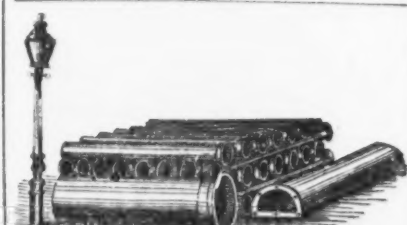
Late **CLARK & COMPANY,**
Original Inventors and Sole Patentees of

Noiseless Self-Coiling Revolving
STEEL SHUTTERS,
FIRE AND BURGLAR PROOF. ALSO IMPROVED
ROLLING WOOD SHUTTERS,

Of various kinds. And Patent
METALLIC VENETIAN BLINDS.

Endorsed by the
Leading Architects of the World.

Office and Manufactory,
162 & 164 West 27th St., N. Y.



R. D. WOOD & CO.,
Philadelphia,

Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS,
Lamp Posts, Valves, &c.,
Mathew's Pat. Anti-Freezing Hydrants.
400 CHESTNUT STREET.

TINIUS OLSEN & CO.,
STANDARD SCALES

AND
Testing Machines.

Manufacturers of all descriptions of Testing
Machines. Tests made daily.

Office and Works, N. W. cor. 19th and
Buttonwood Sts., Philadelphia.

LOCKWOOD MFG. CO.,
SOUTH NORWALK, CONN.,

MANUFACTURERS OF
LIGHT GRAY IRON
CASTINGS.

Metal Patterns,
Iron Toys and
Hardware Specialties

Illustrated Catalogue of
Iron Toys sent on appli-
cation.

L. COES'

Genuine and Mechanics

PATENT

Screw Wrenches

MANUFACTURED BY

L. COES & CO.,

Worcester, Mass.

ESTABLISHED IN 1839.



Our Genuine Wrenches are made with
straight bars, full width and enlarged jaw, hav-
ing ribs cast inside, which strengthen the jaw
and give a full bearing on front of bar. These
improvements, in combination with our new
ferrule, made with double bearings, an iron
tube, fitted to the shank and resting against
the lower bearings, rigidly held in position by
the handle and nut, effectually preventing back
thrust of ferrule (see sectional view), verify
our claim that we manufacture the heaviest
and strongest Wrench in the market. None
genuine unless stamped

L. COES & CO.,
Worcester, Mass.

Warehouse,
97 Chambers and 81 Reade Sts.,
NEW YORK.

DURRIE & McCARTY,
Sole Agents.

ELECTRIC HAY KNIFE.



A perfect Implement for cutting Hay and Straw, or even Muck or Turf. Just the
article for cutting Silos. The handles are so arranged that the operator can stand erect
and put his strength directly upon the Knife.

The shape of the teeth gives the Knife more cutting edge than any other Hay Knife.
The Blade of the Extra Knife is solid cast steel, gold bronzed and polished. The
Blade of the No. 2 is steel, with iron back, painted green.

ELECTRIC HAY KNIFE LIST:

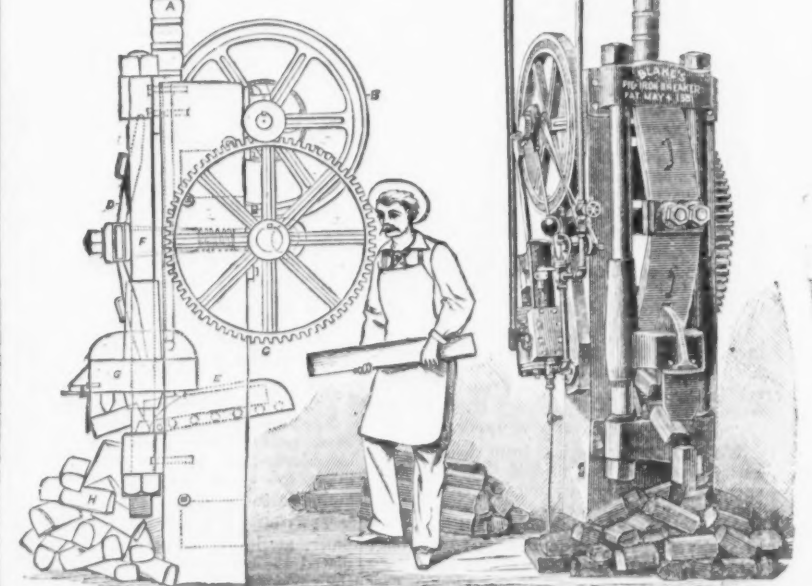
EXTRA CAST STEEL, per dozen, - - - \$18.00

No. 2, STEEL, per dozen, - - - \$15.00

LLOYD, SUPPLEE & WALTON,

No. 625 Market Street, Philadelphia.

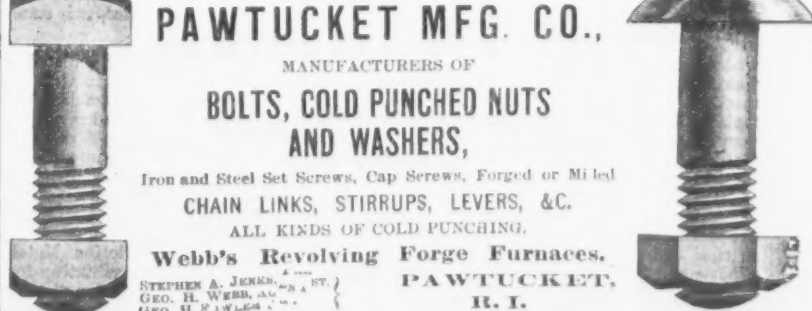
BLAKE'S PAT. PIG IRON BREAKER.



A new and successful machine for breaking pig iron into any length desired, with rapidity and
economy. Besides saving in cost of breaking by hand, it secures the greatest economy in melting.
Several machines already in use. Every machine guaranteed against breakage of parts. Requires
but three horse-power. Can be run by belt or have small engine attached.

Send for Circulars, Prices, &c.

BLAKE CRUSHER COMPANY,
Sole Makers, 85 Orange Street, NEW HAVEN, CONN.



INCORPORATED MAY, 1882.

PAWTUCKET MFG. CO.,
MANUFACTURERS OF
BOLTS, COLD PUNCHED NUTS
AND WASHERS,

Iron and Steel Set Screws, Cap Screws, Forged or Milled
CHAIN LINKS, STIRRUPS, LEVERS, &c.
ALL KINDS OF COLD PUNCHING.
Webb's Revolving Forge Furnaces,
PAWTUCKET,
R. I.

INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

The Somersworth Machine Company in Great Falls run nights in order to meet the orders that are now crowding in upon them.

The new 500-horse-power Corliss engine for the Stark Mills, Manchester, has been put in place. Its balance wheel is 27 feet in diameter, 7 feet 2 inches in width, and it weighs about 40 tons.

MASSACHUSETTS.

The foundation for the new clinching screw factory of Estabrook, Wires & Co., at Milford, is ready for the new structure.

The new Holyoke Foundry has started work. This is an establishment that will bring about 75 skilled workmen into the city—all men.

The Holyoke Machine Company have ordered a 50,000-pound standard testing machine.

The Weir Stove Company, at Taunton, has purchased the foundry formerly occupied by Home & Tinkham, and will run it in connection with their other business. At their Weir Foundry they now turn out 30 ranges a day, and in the new foundry they will turn out 15 stoves per day.

The Kitson Machine Co., Lowell, received orders for 30 Clarke & Perham 3-roll sectional eveners during one week recently.

At Lawrence, Messrs. Steadman, Northrop & Smith, machinists and builders of all kinds of worsted machinery, are putting in a lot of new tools preparatory to extending their business, and also to manufacture card clothing.

CONNECTICUT.

The Cornwall Bridge Iron Company have commenced running their furnace again.

The Craighead & Elwell Hardware Mfg. Co., who recently had their factory burned, have decided to remain in Bridgeport, and will soon erect a brick factory on the premises where the old one stood.

The Hartford Silver Plate Company now has a capital of \$200,000 and is doing a growing business.

The Washburn Car Wheel Company, at Hartford, have ordered a \$3000 lathe and boring machine for their foundry.

PENNSYLVANIA.

King & Perot, Excelsior Bolt and Rivet Works, American and York streets, Philadelphia, are remodeling and enlarging their works, and, in order to meet the increasing demand for their products, they propose to double their capacity within the next three months. They have given orders for new and improved machinery, to be used in the manufacture of bolts, nuts, washers, &c., and have also adopted as their standard thread the United States (Franklin Institute) standard, and all bolts and nuts made at these works are cut to these gauges unless otherwise ordered. They make a specialty of ironwork for bridges, roofs and buildings, and have completed and also have in hand several important contracts for buildings, &c.

W. P. Buck, of Harrisburgh, connected with the Pennsylvania and Maryland Development Company, is completing the arrangements of the organization in this city of the Reading Copper Mining and Smelting Company. The project contemplates the building of a smelting works in this city for the extraction of pure copper from the ore. The company will obtain copper ore from the South Mountain copper belt, extending through Franklin and Adams Counties in Pennsylvania, and Washington and Frederick Counties in Maryland. Eight tons of ore were sent recently to Phoenixville and assayed, and 1500 pounds of copper obtained. —Reading Times.

Dominick Ihmsen has started an 8-pot glass-bottle and prescription factory at Butler. He commenced blowing last week.

The rifling of the steel tubing for the 12-inch Lyman-Haskell multicharge cannon being fabricated at Scott Foundry, Reading, will be commenced this week at the West Point Foundry, N. J. The steel linings for the four powder pockets are now being put in the gun at the Scott Foundry, and the ordnance will soon be ready for shipment to West Point for trial.

Adams & Co., glass manufacturers, of Pittsburgh, have purchased land at West Elizabeth, 22 miles above Pittsburgh, to which place they intend to remove their works.

PITTSBURGH AND VICINITY.

We clip the following from the Commercial Gazette: "The first of the eight steel springs for the Steel Spring Car Motor Company, of Philadelphia, was successfully rolled in the Superior Rail Mill, in Allegheny, yesterday. The billet, 27 feet long, 6 inches wide and 4 inches thick, was ready to be taken from the heating furnace at two o'clock in the afternoon, and after a slight delay, caused by the inexperience of the men in handling metal of that size, was taken to the rolls, where it was passed through backward and forward about 10 times and broken down into a length of 100 feet, 1/2 inch thick, the width of 6 inches being retained throughout. By this time, however, it had cooled so much that it was impossible to proceed, and the piece was taken out to the furnace and heated 30 feet at a time, and then rolled down to the required thickness—1/4 inch. The last part of the process was rather tedious, and required the utmost care on the part of the men, but it was accomplished without further mishap, and when the band was dragged out into the yard and measured, its length was found to be 310 feet—10 feet more than required. The finish was very good. The rolling was witnessed by a number of mill men, who took an interest in it from the account published in this paper on Saturday. The band will be sent to Philadelphia in its present form, and there tempered and wound into the form of the spring, in time to be exhibited in the Bi-Centennial procession. It is by far the longest piece of metal that has ever been rolled in this country. The billets for three other springs are now at the mill, and will be rolled before the end of the week."

The transportation of coke over the Pennsylvania Railroad for the week ended October 7, and year from January 1, is as follows in tons of 2000 pounds:

| | Week. | Year. |
|--|--------|-----------|
| Penn. R. R. (Allegheny region)... | 2,200 | 85,507 |
| West Penn. R. R. | 2,314 | 89,307 |
| Southwest Penn. R. R. | 27,384 | 1,348,931 |
| Penn. and Westmoreland region, P. R. R. | 4,440 | 104,673 |
| Pittsburgh, P. R. R. | 7,475 | 46,810 |
| Snow Shoe (Clearfield region)... | 231 | 16,220 |
| Total | 44,467 | 2,171,639 |

D. W. C. Carroll has at present an order for tanks aggregating a capacity of 600,000 barrels. He says he keeps every hammer in the shop warm from hammering rivets.

Victoria Furnace, belonging to the Iron and Steel Works Association of Virginia, and in process of construction at Goshen, will probably be ready to blow in by November 1.

VIRGINIA.

Messrs. Kilpatrick & Blackford, of Lynchburg, make the announcement that the rolling mill and water-power of the James River Steel Mfg. and Mining Co., near that city, will be sold at public auction on December 14, 1882. The works are constructed, fitted and furnished according to the most approved plan, and the location is said to be very advantageous.

It is reported that Messrs. John Wissler & Sons have sold their Columbia and Liberty furnaces in Stony Creek Valley, Shenandoah County, and 1800 acres of land to a New Jersey company for \$250,000. The purchasers are said to contemplate the erection of rolling and nail mills, and the construction of a railway from Edinburg Station of the Valley Branch of the Baltimore and Ohio Railroad up Stony Creek to these properties.

KENTUCKY.

An accident at the furnace of the Norton Iron Works, at Ashland, broke up one of the furnace engines pretty badly. The running of the furnace was not interfered with, however, as the other engine is sufficient to blow it. The broken engine is being repaired.

OHIO.

The Champion Malleable Iron Company, of Springfield, are turning out from 520 to 550 tons of first-class malleable iron per month, or somewhat over 6000 tons per year. These figures are worthy of notice, being exceptionally high. The company employ 540 men.

The buildings of the new Elson Glass Co. at Martin's Ferry, are rapidly approaching completion, and it is hoped to be making glass in January. It is stated to be a model glass factory, especially in regard to light, convenience and size.

The roof of the casting house of Phoenix Furnace, owned by Brown, Bonnell & Co. at Youngstown, fell in on the night of Oct. 17. No one was injured, and the furnace is running as usual.

The Nail City Glass Co., at Bridgeport, will probably be ready to start up by December 1st.

The Jefferson Iron Works, of Steubenville, have contracted with the Wheeling Electric Light Co. for a 10-light machine on the Fuller system, for their mill.

Work has been commenced on the proposed improvements at the Buckeye Glass Works, Martin's Ferry. They propose to erect a 15-pot Gill glass furnace. The small one now in use will then be taken down and the material in it used in the construction of 5 or 6 ears.

We learn that the capital stock of the Kelly Nail and Iron Co., of Ironton, to which we referred in our last issue, is nearly all subscribed, and active work will soon be begun on the plant. The latter will consist of a coke or stone-coal furnace and a nail mill, to be erected in or near the vicinity of Ironton. Messrs. W. D. Kelly & Sons, of Ironton, are largely interested in the enterprise.

The increase in the capital stock of Whitman & Barnes Mfg. Co., of Akron, mentioned last week, is rendered necessary by reason of large extensions and improvements at their several factories. They have built an entire new shop, fully equipped with new tools, at St. Catherine's, Ont., for handling their Canada business. They have made large extensions to their works at Syracuse, N. Y., and have doubled the capacity of their Akron and Canton shops.

ILLINOIS.

The Excelsior Iron Works, of Chicago, have been putting in a large amount of new machinery, including a new 20,000-pound lathe, and a large trip hammer in the blacksmith shop.

The Chicago Polished Steel Shafting Company, at South Chicago, have nearly completed their works, and hope to be putting their product on the market in a couple of weeks.

There is a report in circulation that a change of management is probable in the Western Steel Horse Shoe Works, at Grand Crossing. The works are shut down at present.

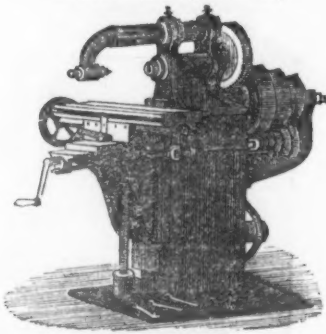
The Lockport Fence Co., of Chicago, are erecting a new factory, the main building of which measures 100 x 36 feet.

The Stone & Westphal Co., who will manufacture bolt and shot cases, will soon organize in Chicago. The capital, it is stated, will be placed at \$20,000.

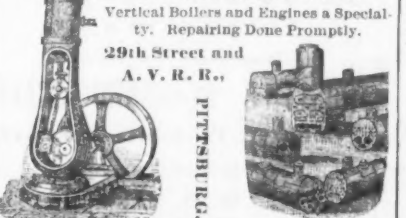
Mr. J. B. Reed, of Cairo, who has been doing a foundry business in that city for many years, recently commenced the manufacture of machine tools, and is now actively engaged in that branch. Some 25 or 30 large and small lathes are now in course of construction, and the number of workmen is being rapidly increased.

MISSOURI.

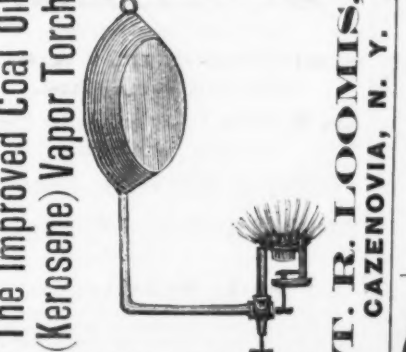
The Diamond Anti-Friction Metal Company, of St. Louis, are negotiating for \$1000 worth of new machinery for their works. The company will also increase their working force. The increase in capacity will be about 50 per cent.

W. R. EYNON & SONS,
CLEVELAND, OHIO.

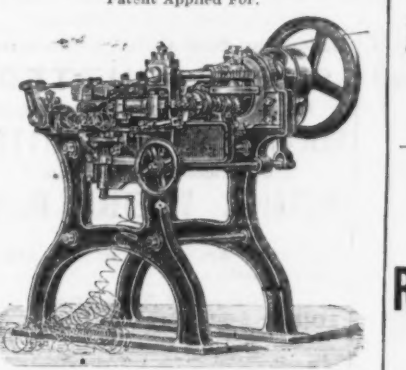
MANUFACTURERS OF
MACHINIST TOOLS, MILLING MACHINES,
Die Stokers, Universal Reeds, Index Centers, Universal Vices, Grinding Attachment for Lathes, Centering Machines, Gear Cutting and Milling Done.
Office and Works, No. 73 Scranton Ave.

VULCAN BOILER WORKS.
JAMES McNEIL & BRO.,
MANUFACTURERS OF
BOILERS, SHEET IRON, ROLLING MILL
AND BLAST FURNACE WORKS.

Vertical Boilers and Engines a Specialty. Repairing Done Promptly.
29th Street and
A. V. R. R.,
PITTSBURGH.



The best light for Foundries, Sheds and Mills. Thon sends in use with perfect satisfaction. It gives a light equal to 12 gas jets. Is cheap and durable. Has been thoroughly tested, and is guaranteed all we claim. Auditors, for circulars, testimonials and prices.
New Furniture Spring Machine.
Patent Applied For.



This Furniture Spring Machine requires the attention of only one workman, and is capable of turning out from 2500 to 3000 pounds of first-class Furniture Springs in 10 hours. For particulars in regard to delivery of these machines and transfer of patents (as soon as obtained) apply to the inventors.
CUST. DEUTEN & CO.,
Düren, near Cologne, Germany.

SMITH'S NEW MODEL
REVOLVERS.

Sold by Gun and Hardware Trade Everywhere.

OTIS A. SMITH,
MANUFACTURER,
Rockfall, Conn.A. F. PIKE.
Pike Station, - - New Hampshire,
Manufacturer and Wholesale Dealer in
Bluestone

For Scythes, Axes, Knives and Turpentine Hacks.
Factories at Pike Station, N. H., and Evansville & Westmore, Vt.
Genuine Old Reliable,
Indian Pond (Red End),
Premium Union,
White Mountain,
Latiche, Hacker,
Diamond Grit,
The New Boss,
Lamelle, Rags,
Willoughby Lake,
Green Mountain,
Black Diamond,
Moving Machine,
German Pattern,
Chocolate, Ax Bits,
Stones made, labeled and branded in any style desired. Price and Quality Guaranteed. All these brands are of clear, k. en grit and will not glaze.

THE WIRE GOODS CO.,
Worcester, Mass.,
MANUFACTURERS OF
SHARP GIMLET POINTED
WIRE GOODS.

WIRE BENDING A SPECIALTY.
Wire Straightened and Cut to Length.



SPECIAL NOTICE.

MY NEW STOCK OF SEASONED

WHITE HOLLY

IS NOW READY.

It is the first arrival of new Holly in the New York market; as to whiteness it is unsurpassable. I have also my usual stock of

WALNUT, MAPLE, CHERRY, FIG'D OAK,
WHITE ASH, AND OTHER FANCY WOODS.

J. RAYNER,

Foot Houston Street, E. R. - NEW YORK.

LARGE HEADS. CHAMPION CITY HEADS.

Horse Nails,

Manufactured from very best NORWAY METAL, that will not SPLIT nor FLAW, are accurately pointed, tough, strong and hold the shoes; soft enough to clinch readily, stiff enough to drive without bending. Every nail uniform and perfect. They are used in thousands of shops with best of satisfaction, and especially liked by "floor-men" for their good reliable driving. Made in two patterns, "LARGE HEADS" and "CITY HEADS".

QUALITY IS FULLY GUARANTEED.

LIST:

| | | | | | |
|--------|------|------|------|------|------|
| Nos. 5 | 6 | 7 | 8 | 9 | 10 |
| 28c. | 28c. | 28c. | 22c. | 21c. | 20c. |

CHAMPION HORSE NAIL CO., APPLETON, WIS.

STEPHENS PATENT
VISE.

Fifty per cent. of time and labor saved by every mechanic using this solid, quick-working Vise. Strongest and most durable of any Vise in the market. Has the latest improved taper, pipe, and other attachments.

For Sale by the Trade.
Office, 41 Dey Street, New York, U. S. A.

MOTLEY & STERLING,

MANUFACTURERS AND DEALERS IN

Railway, Machinists' & Contractors' Supplies,

NO. 86 JOHN ST., NEW YORK.

Also Proprietors of the BINGHAMTON HARDWARE CO., Binghamton, N. Y.

FIRE SHOVELS AND POKERS.

WHEELING HINGE CO.,
WHEELING, W. VA.

Patent Steel Tube and Flue Brush.

Best in the market.
Made any size required.
Combines the properties of a
Scraper and Brush.
Full stock always on hand.

L. B. FLANDERS MACHINE WORKS,
1025 Hamilton St., Philadelphia, Pa.

FRONT RANK OIL
VAPOR TORCH.

This burner and the burner for the Oil Vapor Soldering Furnace. (We make the best furnace ever invented). Will heat any size copper. No smoke. Like the burner for the Front Rank Gasoline Cook Stove, are simple in construction, and acknowledged to be the best in the market. The torch gives a brilliant light and is the cheapest and best for all workshops, street vendors, &c. No perforations to clog up and smoke. Agents wanted. Send for circular and price list. Sample sent to any responsible party to be tested one week.

American Vapor Stove Co.,
6 Champlain St., CLEVELAND, O.

IMPORTANT TO MANUFACTURERS

And all interested in a BRILLIANT and ECONOMICAL LIGHT for heavy manufacturing establishments, such as Rolling and Plate Mills, Foundries, Machine Shops, &c., &c. We call your attention to our improved

VAPOR OIL TORCH LAMP,
the only reliable Torch ever put on the market, and is so pronounced by all who have tested these and other makes. We have reached this success after years of experimenting, and secured our first patent August 31, 1880, No. 235,674. Since then important improvements have been added, for which patents will be secured. Parties putting upon the market Vapor Oil Torches infringing our patents will be restrained by legal proceedings.

THE Dangler VAPOR STOVE AND REFINING COMPANY,
Cleveland, Ohio.

Applied to Buggies, without the use of tools, in one minute. It is made of the Best Spring Steel, Oil Tempered. Sample pair 50 cents. Agents wanted. Send for circular and prices. ADDRESS: CLEVELAND FLUE CLEANER MFG. CO., 22 & 24 Power Block, Cleveland, Ohio.

EVERY RETAIL STOVE OR HARDWARE HOUSE IN THE U. S. CAN EASILY SELL DURING THE SEASON ONE OR MORE GROSS OF

THE
Recognized Standard of the World for Cleaning the
Nickel Plates on Modern Stoves,

Upon many of which there is more Nickel than iron surface to clean. It is also sold
with the guarantee that it is the

BEST AND QUICKEST CLEANER OF SILVERWARE EVER PRODUCED.
PAYS 50 PER CENT. PROFIT.

Price, Per Dozen, \$2. Retail at 25 Cents Per Bottle.
ORDER FROM THE WHOLESALE HOUSES.

MANUFACTURED ONLY BY

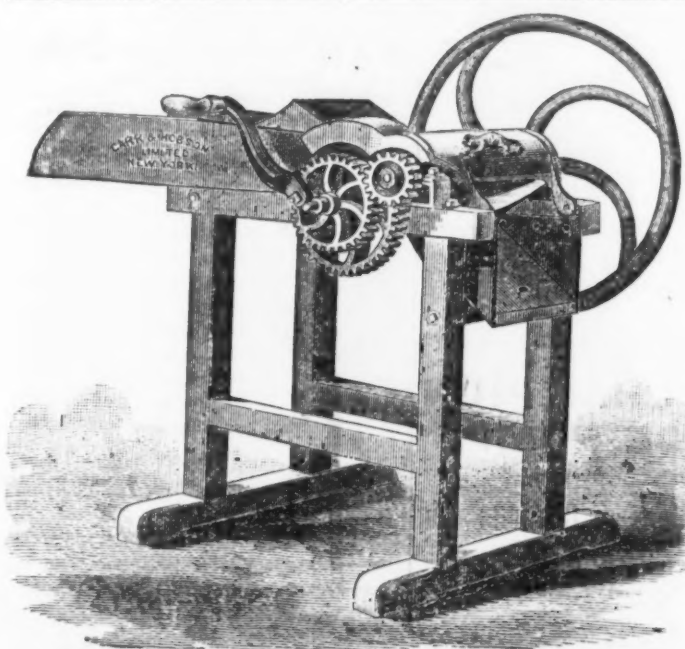
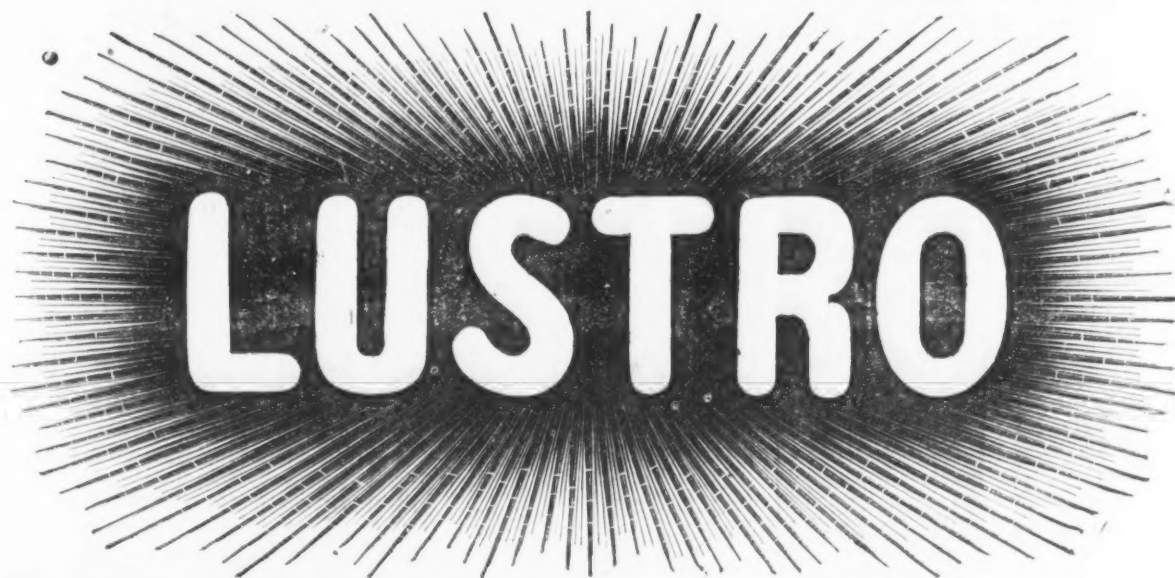
THE LUSTRO CO.,

171 Duane Street, New York.

FRED. W. GARDNER, President.

JOHN T. BROWN, Treasurer.

BEWARE OF IMITATIONS.



THE TIGER FEED CUTTER.

Notwithstanding the fact that our list contains a large assortment of feed-cutting machines of various patterns, we are constantly called upon to furnish a Cylindrical Shear-cut Machine adapted to cutting several lengths in one machine, and for this purpose we have perfected the Tiger Cutter illustrated above, with which different classes of feed can be cut from one-half an inch to two inches, according to the size of the machine. The change from one size to another can be made in a moment.

The working parts of the Cutter which comprise the Feed Rolls, Knife and Bed Piece or Stationary Knife, are confined in iron sides and strongly secured to the frame in such a manner as to give strength and durability in the most convenient and compact manner.

The feed rolls are so constructed and arranged that they will expand so as to take in a very large body of feed, and for the length of the knives is the most rapid Cutter made.

The Knives and Rollers are securely covered, guarding against danger from cutting the operator's hands, in the working parts of the machine.

The first three sizes are made for hand power only, while the remaining ones may be used by either power or hand.

These machines are largely used for cutting Bagasse and Tobacco, as well as for the usual purposes of cutting Hay, Straw, Corn Stalks, &c.

EIGHT SIZES, \$18 TO \$85.

LIBERAL DISCOUNTS TO THE TRADE, AND EXCLUSIVE AGENCIES GIVEN.

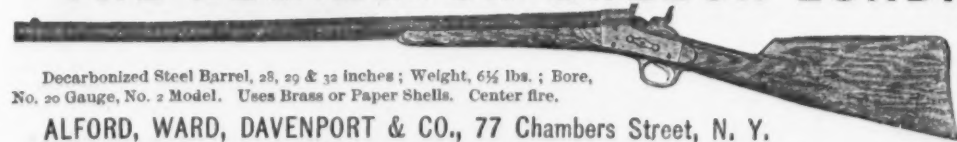
MANUFACTURED ONLY BY

CARR & HOBSON, Limited,

Factory, BERGEN POINT, N. J.

Office, 47 CLIFF ST., NEW YORK.

THE REMINGTON BREECH-LOADING GUN.



Decarbonized Steel Barrel, 28, 29 & 30 inches; Weight, 6 1/2 lbs.; Bore, No. 20 Gauge, No. 2 Model. Uses Brass or Paper Shells. Center fire.

ALFORD, WARD, DAVENPORT & CO., 77 Chambers Street, N. Y.

SIMPLE, SAFE, EFFECTIVE,
None Better!

PRICE, \$10.

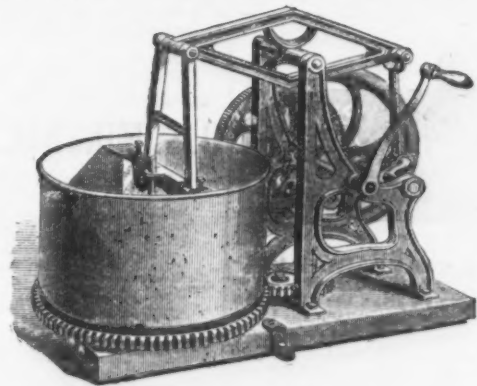
Discount 20 %.

Reference—The Witness. Every
Gun Warranted.

IMPROVED

AMERICAN MEAT CHOPPER,

SEVEN



SIZES.

For Butchers and Family Use.

The only Chopper yet invented that has proved an unqualified success.

ATHOL MACHINE CO., Athol, Mass.,

SOLE MANUFACTURERS.

Send for Price List.

SABIN MFG. CO.

MONTPELIER, VT., MANUFACTURERS OF

DOUBLE-ACTING SPRING BUTTS,

SABIN'S LEVER DOOR SPRINGS, For heavy doors,

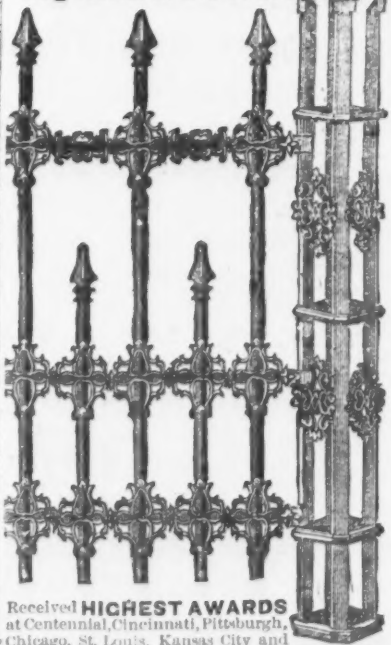
BOSS AND CROWN SPRINGS, For light doors.

Send for Catalogue.

**CHAMPION
IRON FENCE CO.**

KENTON, OHIO.

The most extensive Rail-
ing Works in the U. S.



Received **HIGHEST AWARDS**
at Centennial, Cincinnati, Pittsburgh,
Chicago, St. Louis, Kansas City and
Atlanta Expositions. Diplomas at Detroit, Toron-
to, Canada; Springfield, Ill., and other State Fairs.

ALSO MANUFACTURE THE CELEBRATED
OHIO CHAMPION FORCE PUMP
BEST PUMP MADE!

Located at Kenton, to avoid City expenses.
Send for Illustrated Catalogue (75 pages).

COVERT MFG. CO.,

MANUFACTURERS OF



COVERT'S

Patent Harness Snaps

CHAIN AND ROPE GOODS.

These goods are sold by all leading jobbers in General and Saddlery
Hardware at manufacturers' prices.

Send for illustrated catalogue and price list.

**COVERT MANUFACTURING COMPANY,
WEST TROY, N. Y.**

SPRINGFIELD GLUE AND EMERY WHEEL CO.,

28 Taylor Street, SPRINGFIELD, MASS.

SPRINGFIELD RUBY PAPER.

SPRINGFIELD RUBY WHEELS,

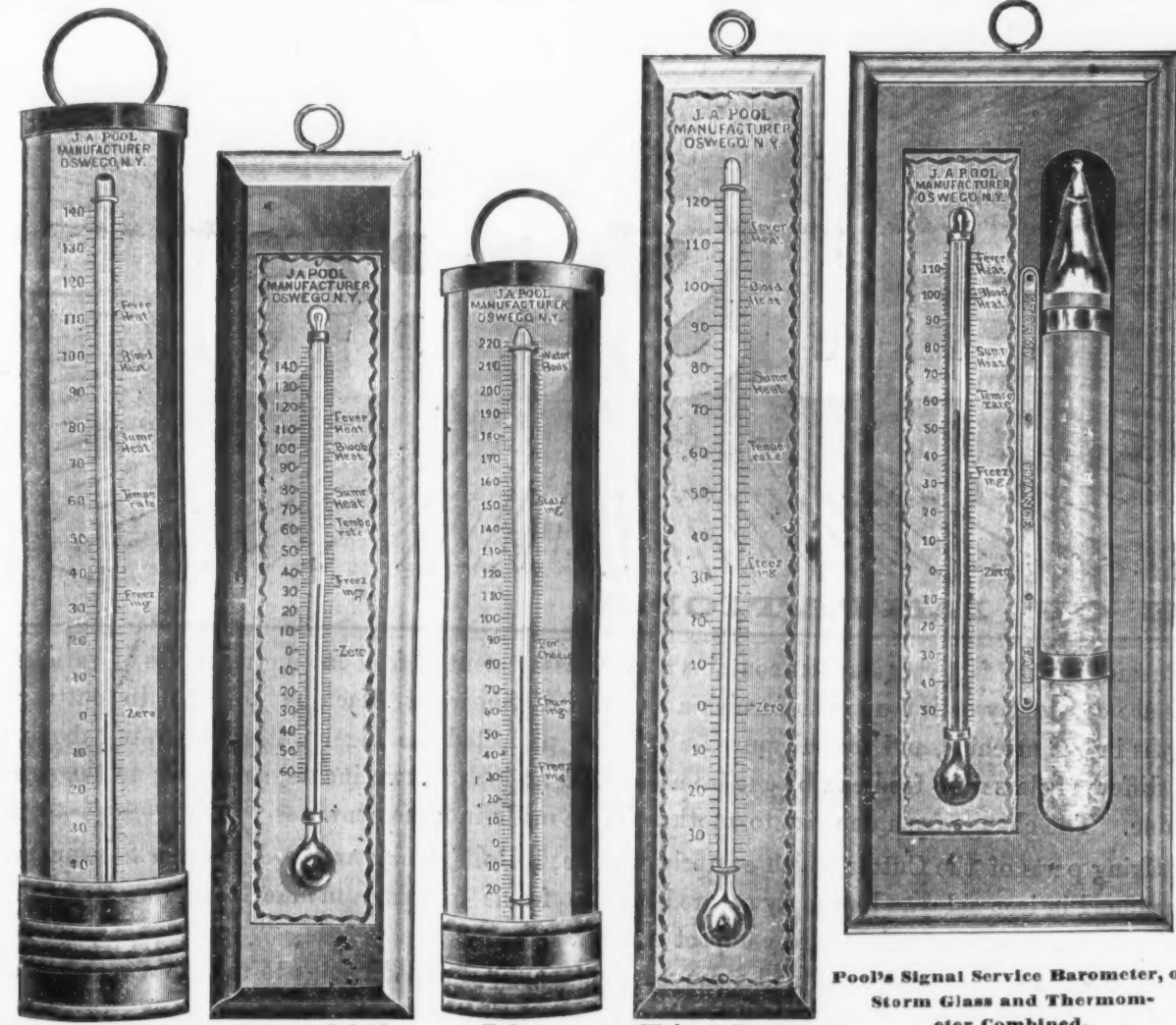
Cut the Fastest and Wear the Longest of anything in the Market. GIVE THEM A TRIAL.

SAMPLE SHEETS OF RUBY PAPER FREE.

EMERY CLOTH, EMERY AND FLINT PAPER, RUBY, CORUNDUM, EMERY AND QUARTZ.

RAW HIDE LACE LEATHER AND BELTING.

Glue, Nickel Anodes, Crocus, Rouge, Composition.



Tin Case, Japanned.
7, 8, 10, 12 inch.

Walnut, Inlaid.
9 inch only.

Dairy.
7, 8, 10, 12 inch.

Walnut, Square.
8, 10 inch.

Pool's Signal Service Barometer, or
Storm Glass and Thermometer Combined.
Length 9 5/8 inches. Width 3 1/4 inches.

OSWEGO THERMOMETER WORKS,

Largest Establishment of the Kind in the World.

OSWEGO, OSWEGO CO., NEW YORK.

MANUFACTURERS OF ALL KINDS OF

BAROMETERS AND THERMOMETERS,

And Pool's Signal Service Barometer, or Storm Glass and Thermometer Combined.

THE GREAT WEATHER INDICATOR.

Our goods are the most accurate and finely finished of any in the market. Be sure to call for Pool's instruments, and see that the Storm Glass is the genuine Signal Service Barometer, with trade mark and signature of "J. A. Pool," in red ink on back of each instrument, as here shown. All others, Weather Indicators, Prognosticators, &c., &c., are worthless imitations, of which buyers and the public should beware.

FOR SALE BY ALL JOBBERS.

Be sure you get J. A. Pool's make; they are the best. Take no other.

BILLINGS' PATENT OIL VAPOR TORCH.

This torch burns the common Coal Oil, good water-white Coal Oil being preferred. The oil is converted into a vapor which burns like gas, without wick or chimney, and produces a most powerful light, easily regulated by a needle-valve. This Torch has now been in use some two years, and its sale is steadily increasing. It is especially adapted for

Foundries, Factories, Machine and Work Shops, and is so constructed as to withstand the hardest usage.

CAUTION.—To protect the public from the inevitable consequences of using or vending a device covered by Patent, when put upon the market by unauthorized parties (and often with some slight change in construction, amounting to nothing more than a mechanical equivalent), we will state that we are the inventor and sole owner of the only Letters Patent on a Coal Oil Vapor Torch, which Patents are dated July 14th, 1880, No. 238,799, and March 8th, 1881, No. 235,931. We have also to state that we have commenced suit in the U. S. Circuit Court for the Northern District of Ohio, against parties infringing our rights, which we shall prosecute to the end; and all will hereafter be held to strict account for any violation of our rights.

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393 Bond Street, CLEVELAND, OHIO.

DAVID HYMES,
4 MURRAY ST., NEW YORK,
Manufacturers' Agent

SKATE KEYS,
SKATE STRAPS,
HEEL PLATES,
Soft Grey and Malleable Castings.

HUBBELL'S PATENT METAL CORNERS

FOR OIL CLOTH,
With Binding to Match.

Protect them from wearing and are ornamental. These goods need only be seen by the public; the real merits are at once appreciated. Sample orders solicited, and circulars sent on application.

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Patentes and Sole Mfrs in U. S. and Canada.
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STEEL HOIST, UNDER Thompson's Patent.
NO WORM GEAR.
NO FRICTION BRAKES.
Made of Annealed Cast Steel and Malleable Iron.
DOUBLE SPEED.
100 to 40,000 Lb. Capacity. Sole Manufacturers in America.
STEEL HOIST MFG. CO.
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NEW MAKE OF MINE LAMP.
THREE DIFFERENT SIZED SPOUTS.
SEAMLESS BRASS COLLAR, BRASS HINGE, Solid Lid.
NO SOLDERING THE HINGE CANNOT MELT OFF.
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THE MORGAN VARIABLE BLAST TUYERE IRON

With the front plate removed, showing the Rotating Air Tubes by which four different sized currents of air may be passed, making any size fire from 3 to 18 inches in diameter. We also furnish an attachment by which we make a narrow fire long or short. This Tuyere Saves Half the Coal, makes a clean fire, gives a center blast, and directs just the amount of heat needed to the point to be heated. We also furnish a Water Tuyere (see advertisement in first issue of this month) that keeps fire-bed cool, prevents Tuyere from burning, and gives all the hot water needed. All Tuyeres guaranteed to please or no sale. Special inducement to the Trade. Catalogues sent free. Address

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\$50 A DAY GUARANTEED
THIS AUGER MAKES A WELL 3' IN DIAMETER 15 FT. PER HOUR.
SEND FOR CATALOGUE.
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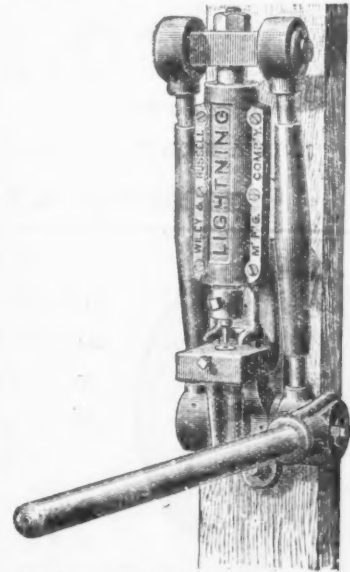
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Of All Kinds.
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Bolt Cutters for hand or power.
The celebrated Lightning Screw Plates, cutting from wire sizes to 1 1/2.
Pipe Taps and Dies.
Taps, Dies and Reamers for use in the Bit Brace.
Tire Wheels, Tire Bolt Wrenches, Nut Wrenches.
Green River Tire Upsetters.
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Send for Illustrated Price List.

NEW CHAMPION FORCE PUMP.

HAS
Vacuum Chamber and Air Chamber,
PRODUCING
A CONTINUOUS FLOW OF WATER,
Both in Suction and Discharge,
AND THEREFORE
WORKS SMOOTHER
AND
EASIER
THAN ANY OTHER FORCE PUMP IN THE MARKET.
HAS
Seamless Drawn Brass Cylinders and No Stuffing Boxes.
Never Freezes in Winter, and is Not Liable to Get Out of Order.
With hose attachment it is valuable as a fire protection, and for sprinkling lawns, gardens, &c.
It is light, neat, and easy to handle, and yet strong, substantial and durable, and is adapted to all kinds of wells, dug, drilled or driven.
Send for descriptive circular and price list.

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Manufacturers of

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NEW pattern Heavy Screw Clamps strongest in the market.
For sale by all the principal Hardware Dealers.
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MALLEABLE IRON CASTINGS
Of superior quality, and Hardware Specialties in Malleable Iron made to order.

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THE ELECTRIC LIGHT TORCH.

The Cheapest and Best Light in the World.

This Torch Vaporizes Common Coal Oil and is especially adapted for Workshops, Foundries, Store-rooms, Blacksmith Shops, and for Street purposes. They make a strong white light, equal to 6 ordinary Gas or lamp lights. These torches are made strong, yet simple in construction.

AGENTS WANTED.

A sample torch will be sent to any responsible party on, say a week's trial. Prices named on application.

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A fibrous material, encasing about 90 per cent. of its volume of air, and therefore a superior

NON-CONDUCTOR OF HEAT AND SOUND.

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Extra Grade, 14 lbs. per cubic foot.
Circular and Sample free by mail.

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Manufactured by
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"Superior in Every Respect."
This is one of the best selling Locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited. Address as above.
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Front and Laurel Streets,

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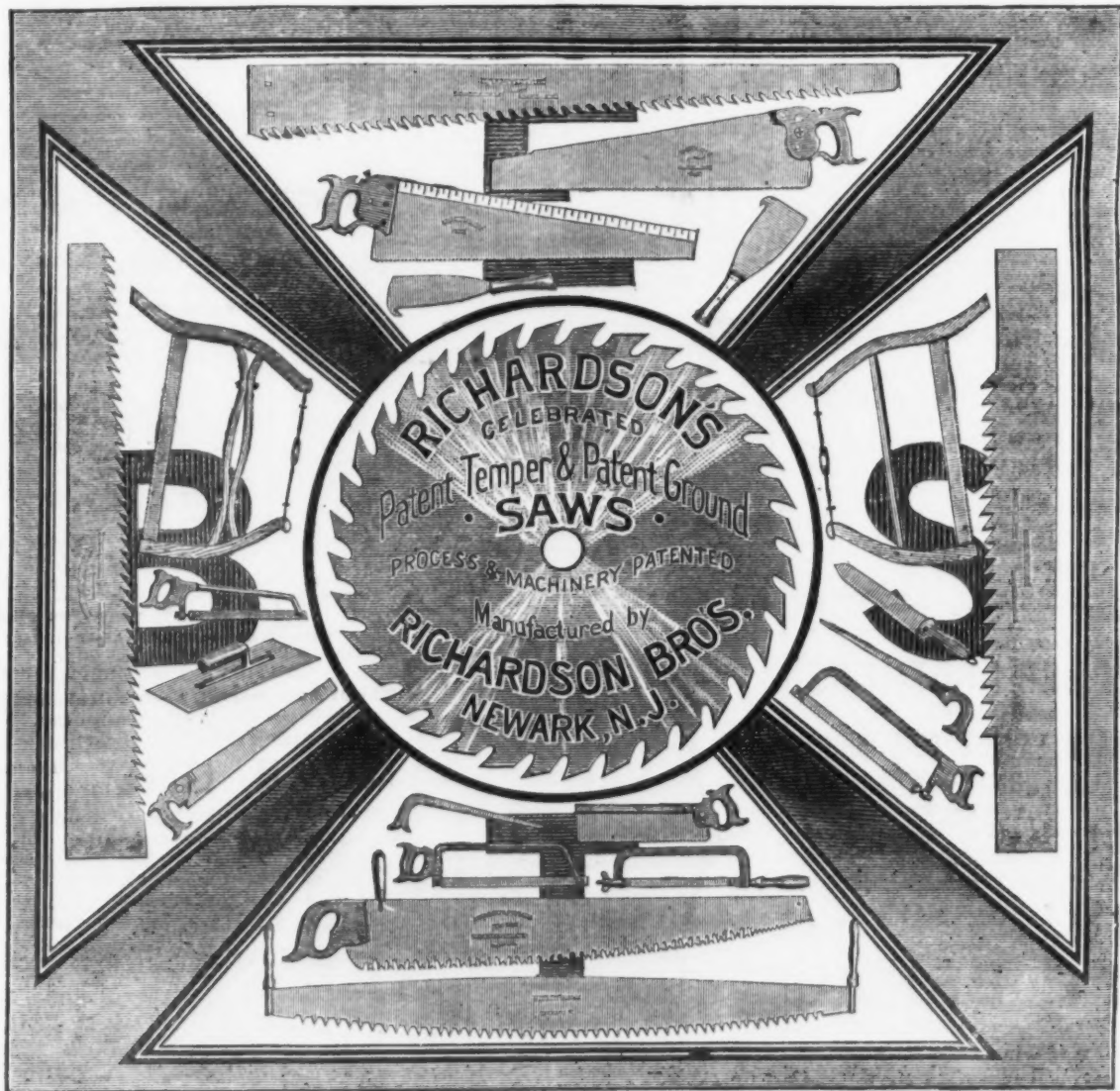
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NARROW CROSS CUT SAW, WITH HANDLES COMPLETE.

These Saws have been made by us for years, and their utility for cutting down trees can best be told by their use. They are not so liable to bind by kerf-closing.

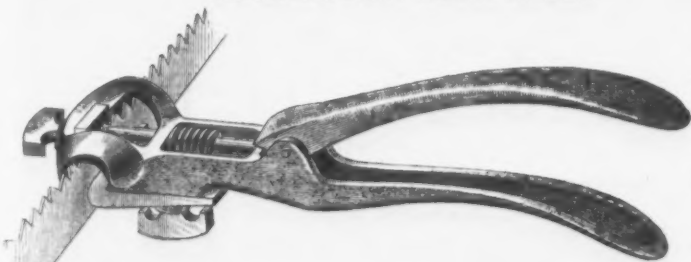


Reversible Handles sent with these Saws if so Ordered, Otherwise Loop Handles will be sent.



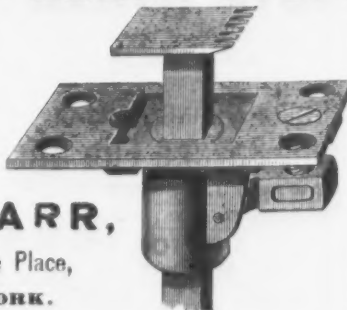
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FOR SETTING EVERY VARIETY OF SAWS.



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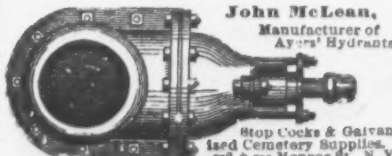


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MANUFACTURERS OF
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Send for Price List
and Terms 535 5th Ave., N. Y.

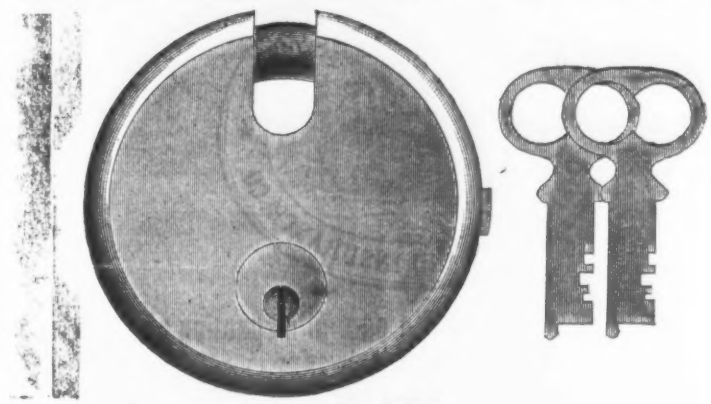


WILCOX & HOWE, Birmingham, Ct.
Carriage Hardware.

(See The Iron Age first issue of each month).



STILL ANOTHER



(No. 4003.)

SELF-LOCKING PAD LOCK

BY THE

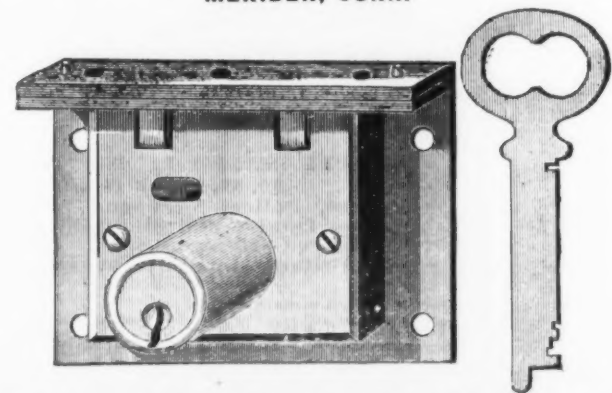
EAGLE LOCK CO.,

Terryville, Conn.

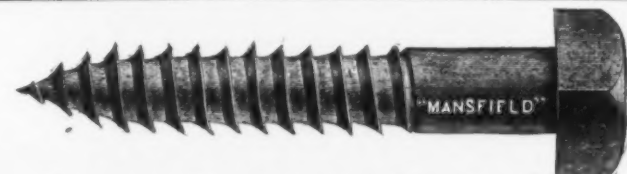
It is made of wrought brass, and is furnished either brass or nickel-plated. It is novel in its construction, perfect in its operation and very secure. It is locked by a slight pressure on the projection shown on the right side of the cut.

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THE CHARLES PARKER CO.,
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MANUFACTURERS OF CABINET LOCKS.



The Mansfield Bolt & Nut Co.

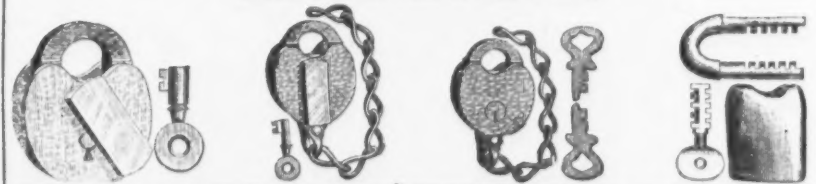
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Manufacturers of Coach Screws with gimlet points; full square turned head Carriage, and full square common Carriage Bolts; best quality Machine Bolts, &c.

WE CLAIM THAT OUR GIMLET-POINTED COACH SCREWS ARE THE BEST IN THE MARKET, AS IS ATTESTED BY THE LARGEST TELEPHONE, TELEGRAPH AND ELECTRIC LIGHT COMPANIES IN THE UNITED STATES WHO HAVE ADOPTED THEM. SAMPLE ORDERS SOLICITED, AND SAMPLES CHEERFULLY MAILED ON APPLICATION.

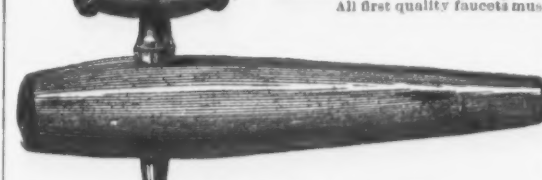
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PADLOCKS,

Manufactured by JOHN J. TOWER, 96 Chambers St., New York.
BEST QUALITY. LARGE VARIETY.
Railroad and other Padlocks made to order.



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Manufacturer of every description

WOODEN FAUCETS,
Mallets and Variety Wood Turning.



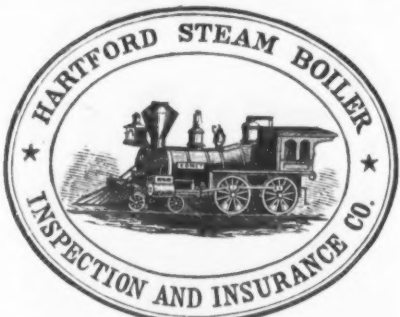
JOHN SOMMER'S BEST METALLIC KEY.

Cork Lined, first quality, warranted. Metallic Key, Lignumvi a Key, Rosewood, Red Cedar, Cherry and Butternut Faucets.

John Sommer's Metallic Key and First Quality Cork-lined Faucets are the best. Send for catalogue.

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CASTINGS, ROLLS,
CLEVELAND, OHIO.
INGOT MOLDS, ANNEALING POTS,
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Issues Policies of Insurance after a careful inspection of the Boilers
COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,
ARISING FROM
STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of Steam Boilers.

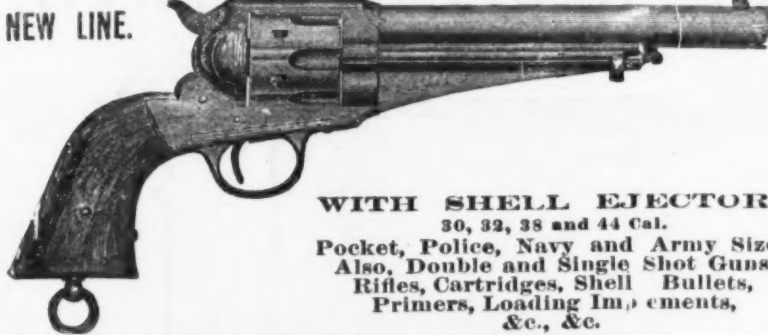
Full information concerning the plan of the Company's operations can be obtained at the
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or at any agency.

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Pocket, Police, Navy and Army Sizes.
Also, Double and Single Shot Guns,
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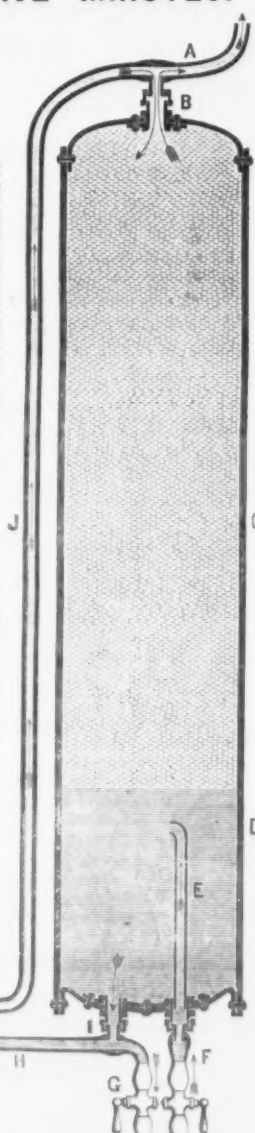
Patented.

This Cutter is made of Steel, and all the wearing parts are hardened. There is no block to fall out. The wheel can be adjusted quickly with the handle, thus saving time to the user. This tool is simple, strong and durable, and when once tried will be always used.

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HOT WATER
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Creque's Patent New Circulation Range Boilers.
13 Different Styles, Adapted and Warranted for Every Possible Situation.
CREQUE, RONALDS & CO., 54 Cliff Street, New York,
SOLE MANUFACTURERS.
SEND FOR ILLUSTRATED CATALOGUE.



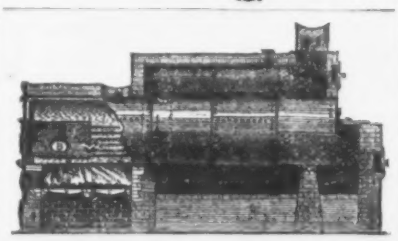
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TORCH.

The Largest Flame!
THE WHITEST LIGHT!

For Foundries, Store
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Perfect combustion ac-
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Efficient.

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LOWE & WATSON, Proprietors,

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The Lowe Patent Tubular Boiler, with and without Superheating Drums. Fourteen years' use proves them the most durable and reliable boiler known. Gives dry steam. The process of combustion of the gases in the construction and setting. Burns any fuel; obtains as much result from it as any boiler or setting with no more cost, and greater durability.

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BEST AND CHEAPEST.

Established 1845.
Office, foot of Houston Street, East River,
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FIRE BRICK
Stove Linings,

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FIRE BRICKS,
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Edge Pressed Furnace Blocks,

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Above Race, PHILADELPHIA.

Twenty years' practical Experience.

WATSON FIRE BRICK CO.,

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Successors to JOHN R. WATSON, Perth Amboy, New Jersey

Manufacturers of

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FOR ROLLING MILLS, BLAST FURNACES, FOUN-
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Fire Clays, Fire Sand, and Kaolin for Sale.

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FIRE AND RED BRICK.

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A. HALL TERRA COTTA CO.,

Manufacturers of

FIRE BRICK, FURNACE BLOCKS, &c.

ARCHITECTURAL TERRA COTTA.

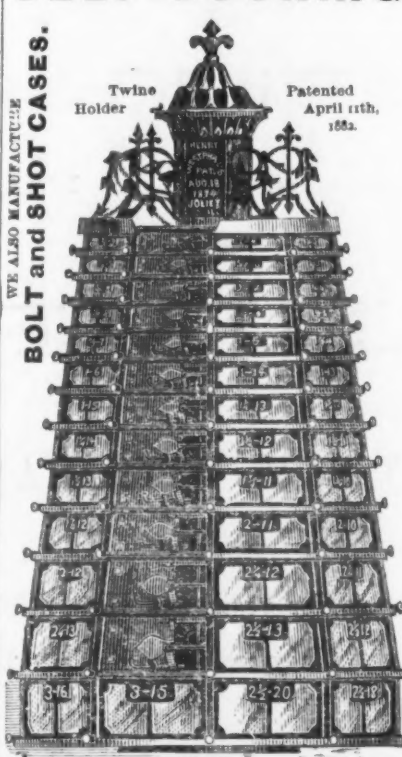
Moulded, Buff and Colored Building Brick.

Perth Amboy, N. J.

WESTPHAL'S PAT. INDEPENDENT REVOLVING SHELVES

SELF-LOCKING SCREW CASE.

Made from the Best Gray,
Malleable and Sheet Iron.



This is not a Drawer Case. This structure has been
purposely invented on account of trouble caused by
a Drawer.

The Standard of This Case is a Hollow Cone,
Firm as a Rock, on Which all
Shelves Revolve.

All Shelves can be taken off and replaced in a few
minutes.

The ornamental front frames of each Circle, well
protected, contain a piece of glass, whereby the user
can see through all Compartments in a minute,
and if any number is out, can fill, or if not in stock,
can order, which in a Drawer Case makes a great
deal of trouble. The front frames can be taken out
and replaced by anyone in no time, thus making it
the most perfect structure ever placed upon the
market. With beauty and strength combined, it
surpasses even perfection in the highest state.

YOU HAVE NO DRAWERS TO TAKE OUT OR PUT BACK.
No mixing of Shelves by Customers helping them-
selves, as is the case with DRAWERS TAKEN FROM THE
SHELVES; OR STILL WORSE, WHEN STANDING ON THE
COUNTER. No losing of Customers while looking
through Drawers of mixed Shelves.

IN OUR CASE ONLY ONE COMPARTMENT IS OPEN AT THE
TIME AND THE BALANCE ALL CLOSED. No one can get
into the Case except the man behind the counter.

Any number can be found instantaneously. By
turning to the right, numbers INCREASE, by turning
to the left, DECREASE. All numbers are cast on the
Frames and gold-bronzed. WE GUARANTEE OUR CASE
FOR 5 YEARS, AND IF NOT FOUND SUPERIOR TO ANY CASE
NOW OFFERED TO THE TRADE, AFTER THAT, CAN BE RE-
TURNED AT OUR EXPENSE, AND WILL REFUND THE
MONEY.

HENRY WESTPHAL,

MANUFACTURER,

86 Market St., CHICAGO, ILL.

American Bolt and Screw Case Co.,

Successors to W. R. Baker & Co., DAYTON, OHIO.



MANUFACTURERS OF
REVOLVING BOLT AND SCREW CASES.

We would respectfully call your attention to
our Bolt and Screw Cases, which we have been
introducing into the market for the past year,
and our sales have so far exceeded our most
anguine expectations that we have lately very
materially increased our facilities for manu-
facturing the same, in which connection we have
added several improvements, which make them
now as perfect and complete as well as orna-
mental, as could be desired. We are now using
iron standards, screwed firmly into an iron sub
in the bottom, which makes them perfectly true
and solid. The tops and bottoms are double,
with the grain of the wood crossed, glued and
screwed together and braced with iron bolts,
which bind the whole firmly together, thus mak-
ing strong enough to bear three times the weight
that can be put into them, and by which means
they revolve perfectly true and easy. Both Bolt
and Screw Cases are made of the best seasoned
Tennessee poplar, finished in imitation of black
walnut. The fronts of doors are of best Norway
pine with the sides which they contain nicely
printed on, making it as desirable as a picture
and beautiful appendage to hardware stores.
We have endorsements from the American Screw
Co., and innumerable testimonials from the large-
est jobbing hardware houses in the country, as
the most practical, durable and ornamental
cases in the market, and no hardware or iron
store is complete without one, as they prevent
mixing of screws and bolts, thus enabling them
to keep their stock in good shape, thereby sav-
ing it a pleasure to handle them instead of a
task. The saving of time, as well as the con-
venience of handling, is a consideration not to be
bought for the cost of a case. The drawers are
provided with stops to prevent their removal,
and will hold a package of bolts or screws.

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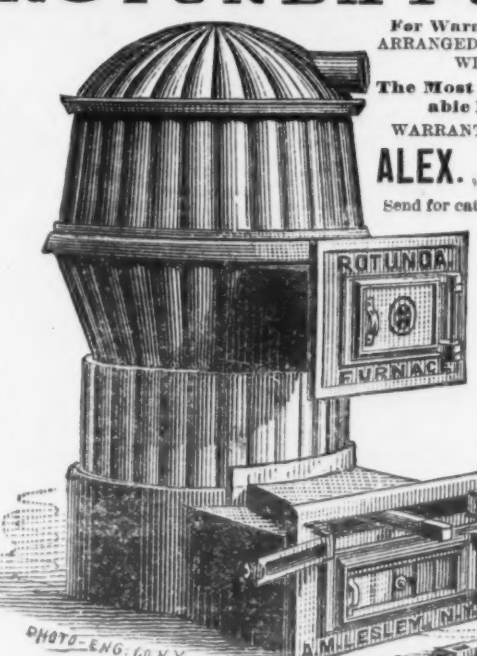
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Co., Pittsburgh, Pa.; A. F. Shapleigh &
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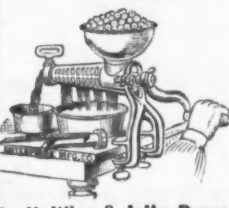
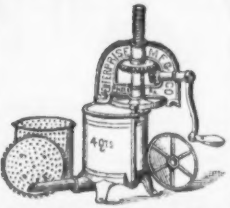
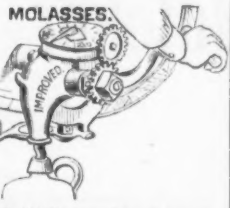
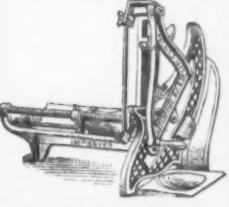
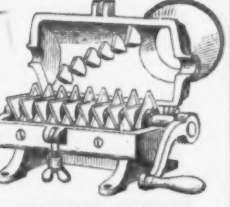

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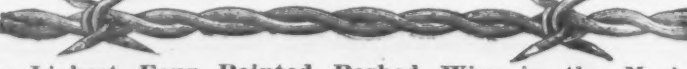
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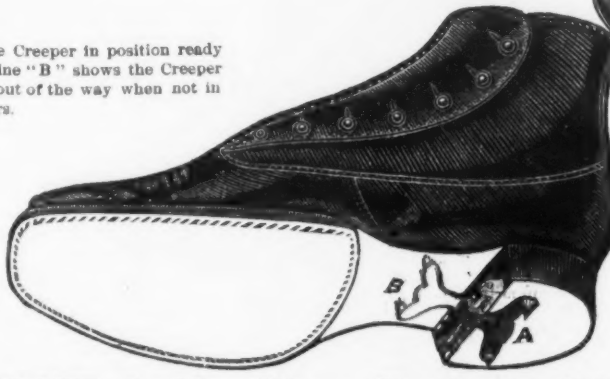
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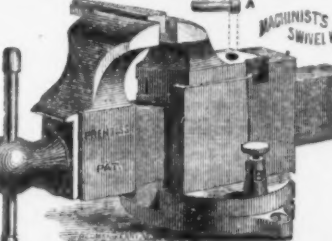
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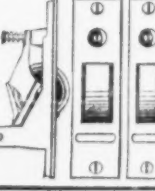
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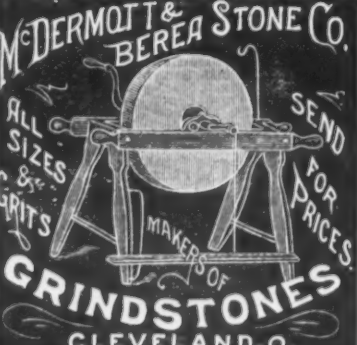
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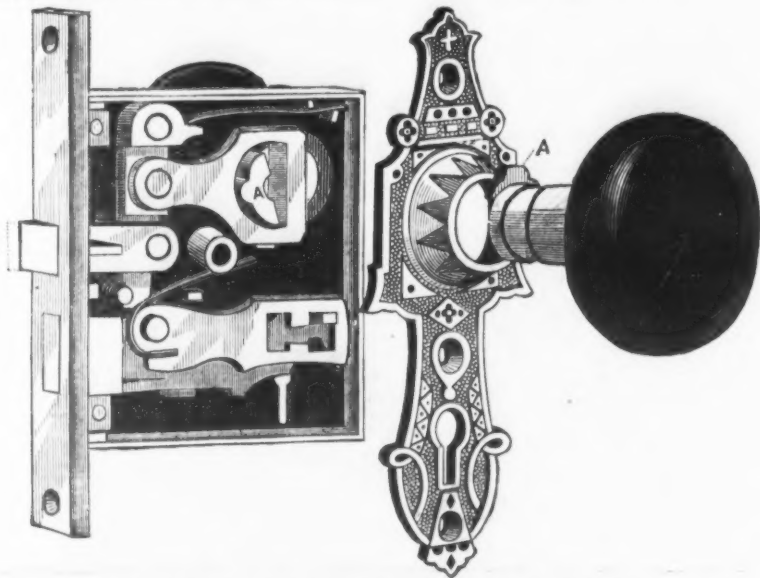
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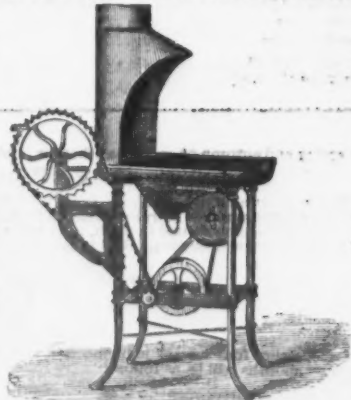
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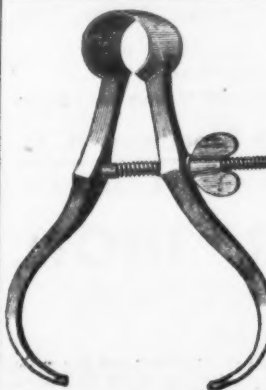
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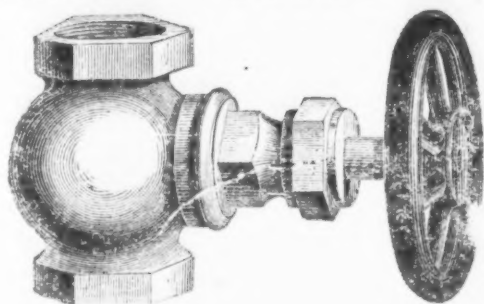
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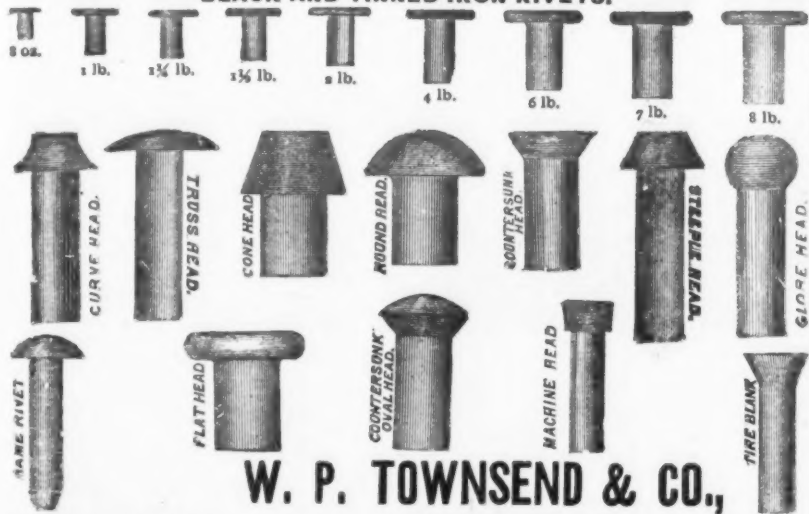
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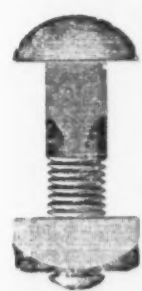
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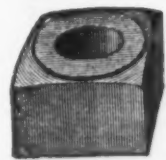
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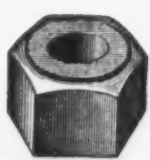
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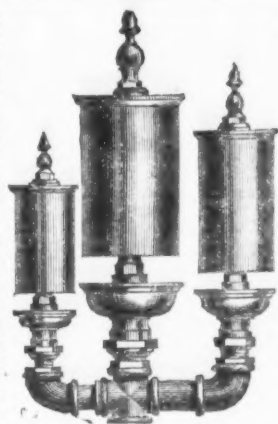
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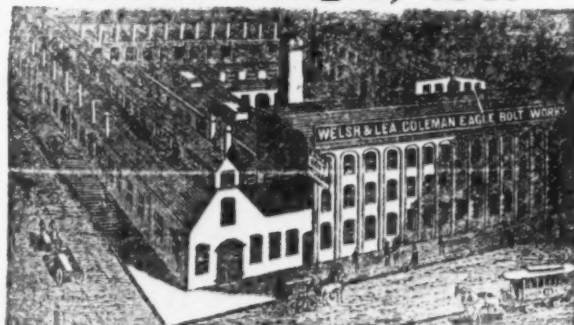
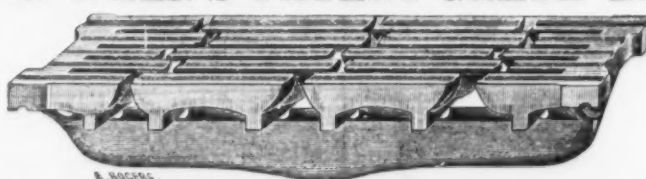
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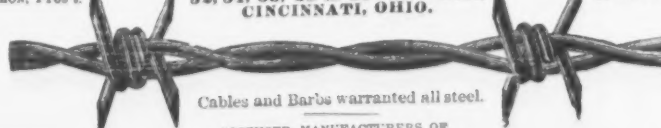
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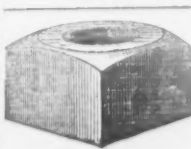


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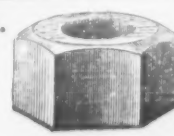
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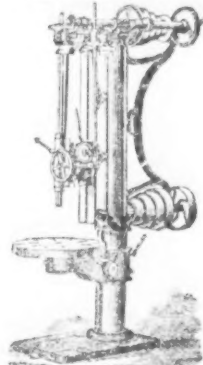
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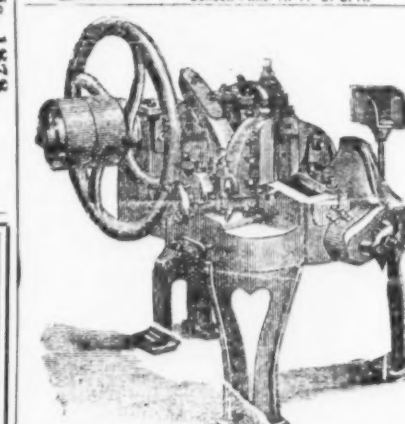
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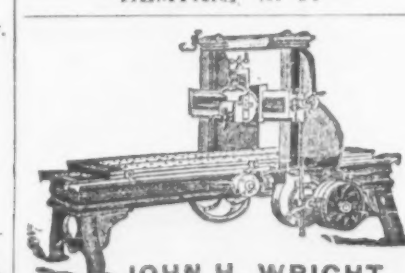
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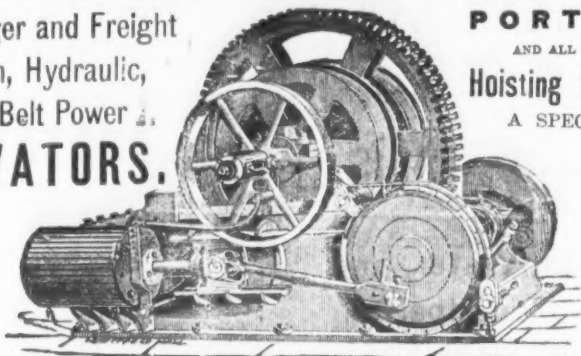
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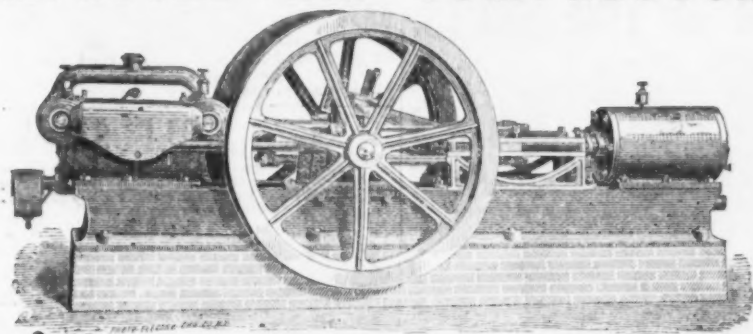
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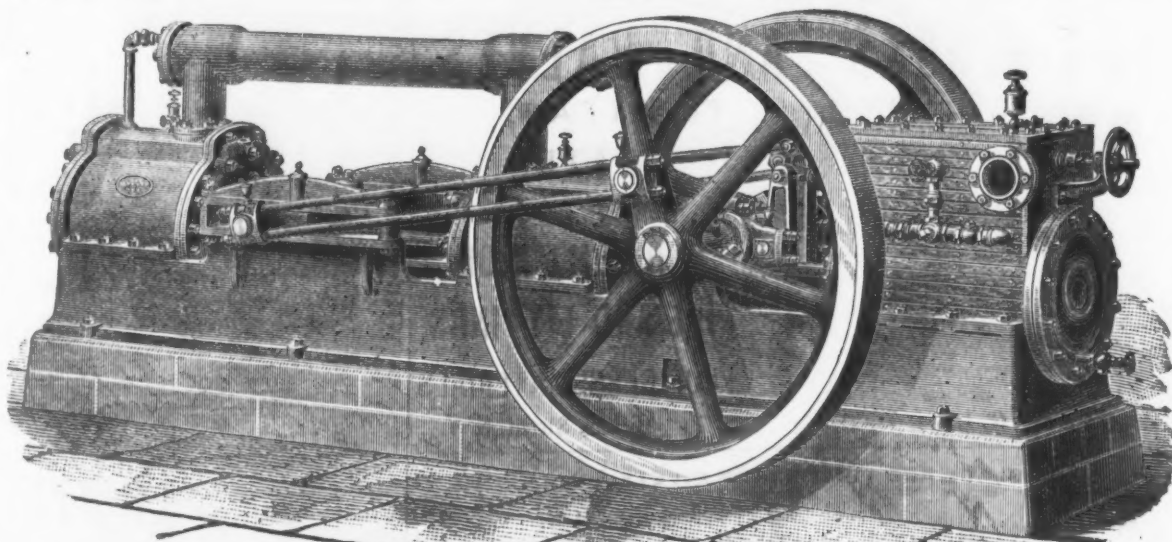
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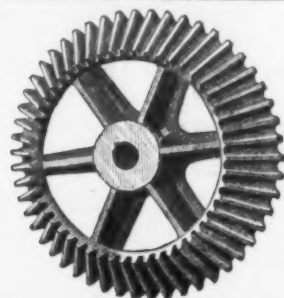
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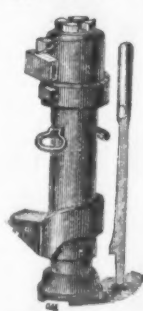
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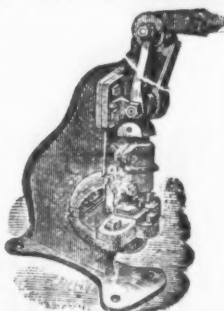
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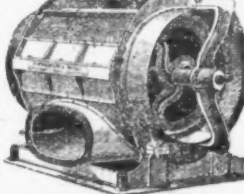


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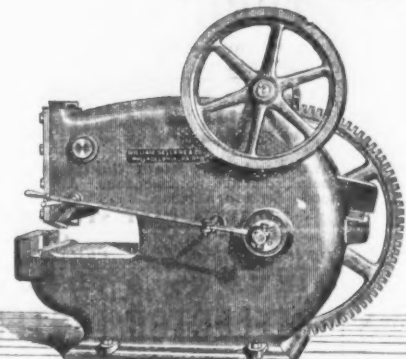
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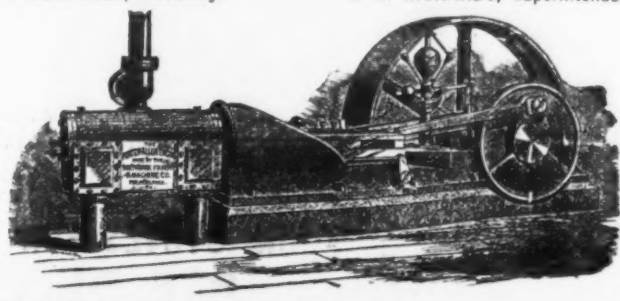
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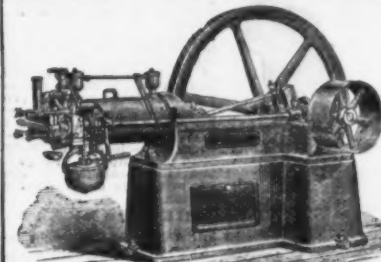
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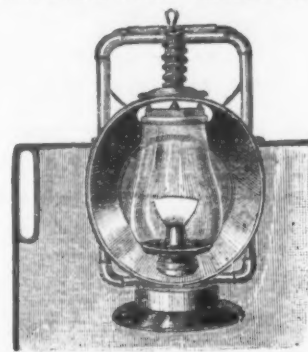
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